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Market competitiveness and Big 5 pricing: Evidence from China's binary market

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Abstract

Big 5 auditors enjoy a worldwide audit fee premium that is believed to be attributable primarily to their reputation for providing high-quality services to clients. This study finds that the fee premium is also attributable to a lack of competition in the market. Taking advantage of the binary structure of the audit market in China, we compare the pricing practices of the Big 5 in the competitive statutory market and the less competitive supplementary market. Although the Big 5 have a reputation for high-quality audits in both markets, the degree of competition in the two markets is very different. Using audit fee data from the period 2000 to 2003, we find that the Big 5 earn a significant fee premium in the less competitive supplementary market, but not in the competitive statutory market. Although our results do not completely rule out reputation as an explanation, they are consistent with the notion that the audit fee premium that is earned by the Big 5 is more likely to be attributable to their dominant market position than to their reputation in the emerging Chinese markets, in which the usual audit-quality benefits for investors and managers are either absent or minimal.

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Keywords: Big 5; Audit pricing; Binary market structure

1. Introduction

The relation between audit pricing and auditor concentration is of primary interest to regulators and users of financial statements. The demise of Arthur Andersen and the ensuing shrinkage of the Big 5 to the Big 4 has added to regulators' concerns about the lack

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of competition in the audit market brought on by increased concentration. It is not clear, however, that market concentration has indeed led to reduced competition among certified public accountant (CPA) firms. While the existence of fewer audit firms may give those remaining firms more market power in recruiting and retaining clients, there are also concerns that audit firms compete too aggressively when they become very large.¹ In response to those concerns, the General Accountability Office (GAO) in the United States prepared a report in July 2003 on the potential efforts of consolidation of public accounting firms on competition. By employing a simple model of pure price competition, the GAO observed that a high degree of concentration is not necessarily inconsistent with a price-competitive environment. However, although it found no evidence that the consolidation of the largest audit firms from eight to four was associated with “impaired competition”, the GAO concluded that existing research on the impact of consolidation on audit quality, auditor independence, and pricing is “inconclusive”. Similarly, the U.K. Office of Fair Trading (OFT) found no evidence of uncompetitive behavior in the U.K. audit market (Beattie, Gooddacre, & Fearnley, 2004).

Extant empirical studies focus mainly on the existence of a fee premium for large audit firms and whether this fee premium is due to the reputation of the auditors or their dominant position in the market. The results are inconclusive at best. Whereas some studies (Baber, Brooks, & Ricks, 1987; Pearson & Trompeter, 1994) have failed to find the existence of a significant fee premium for Big 8 (or Big 6) auditors, others have found the opposite (Bandyopadhyay & Kao, 2001; Ward, Elder, & Kattelus, 1994). Research results are also inconsistent on the underlying reasons for the fee premium that is earned by large firms, if it exists. Earlier studies (for example, Simunic, 1980) suggest that relative market power is the reason for the fee premium, whereas more recent studies (Francis, 1984; Francis & Simon, 1987; Palmrose, 1986) have tended to attribute this premium to product differentiation, reputation, and industry specialization of large firms. These inconsistent results may reflect the lack of a research setting in which the impact of the brand name reputation of auditors on audit pricing can be isolated from their dominant position in the market (Thornton, 2001).

We argue that, in the long run, the reputation and market power of the large public accounting firms are not mutually exclusive in their influence. A powerful market position without quality services is not sustainable, as the market will soon come to detect the false reputation (if priced) and penalize the auditor that has cheated. Furthermore, independent audits are often used as a monitoring mechanism to mitigate the agency problem by attesting to the GAAP conformity of financial statements. Companies with high agency costs are more likely to hire quality auditors to signal to the market that their managers are not expropriating from outside shareholders. The motivation for corporate management to signal the high quality of a firm's financial reporting creates a demand for quality audits, which sustains the market concentration of quality auditors. The large market share of quality auditors can be maintained only if auditors continue to provide the expected high-quality services, otherwise the signaling effect of quality audits would diminish and the market share of quality auditors dwindle. The loss of clients that was experienced by Arthur Andersen immediately after the Enron scandal was clear evidence of the interdependence

¹ Financial Reporting Council (1991), “The State of Financial Reporting: A Review.”

between audit quality or reputation and audit market share. As quality audits require more work to complete, auditors that provide a greater degree of assurance of quality through their reputation will charge an additional fee to cover their incremental costs. In this regard, reputation and market power are joint determinants of the fee premium. Attributing the fee premium to reputation or market power alone is, at best, an incomplete explanation. However, the joint nature of the effects of reputation and market power on the fee premium does not necessarily mean that they carry equal weight in determining audit fees. It is likely that one dominates the other in specific markets and specific periods, which would explain why many previous studies have concentrated on determining whether the fee premium in their sample was caused by reputation or market power (Francis, 1984; Francis & Simon, 1987; Palmrose, 1986; among others).

Moreover, in the short run, and especially in transitional economies where the detection of the mispricing of reputation by market participants may take longer than in developed markets, it is possible that either reputation or market power alone is sufficient to allow auditors to earn a fee premium. In such cases, the audit fee premium is more likely to be attributable to the lack of competition in a market where the demand for quality auditing is low and the dynamics of audit supply and demand have not reached equilibrium. The Chinese stock market seems to be a promising testing ground for such a hypothesis, as the Chinese government advocates the use of Big 5 auditors for supplementary audits, whereas the managers and controlling shareholders of firms do not see the benefit of seeking a high-quality audit because the usual economic gains that such audits bring are not available in China. As is discussed in detail later, raising additional capital from foreign investors after an initial public offering (IPO) is virtually impossible, and lending rates for bank loans are so tightly controlled by the government that the difference in interest rates is negligible. Therefore, the often-cited benefit of quality audits in lowering financing costs cannot justify the fee premium in China.

In addition to a statutory audit, Chinese companies with foreign investments are required to undergo a supplementary audit. The statutory audit market has a low entrance barrier and is highly competitive, but the supplementary market is dominated by the Big 5 because of China's regulatory preference for large foreign auditors. This binary market setting provides a quasi-experimental opportunity to test whether the Big 5 charge a fee premium, and, if so, whether this premium is more likely to be attributable to their brand name reputation or their relative market dominance. Using 434 observations (217 supplementary and 217 statutory audits) from 2000 to 2003, we find that the Big 5 charge significantly higher audit fees in the supplementary auditing market, which they dominate. However, their fees are not significantly higher than those of local firms in the competitive statutory market, in which the Big 5 may take advantage of their brand name reputation but do not enjoy oligopolistic power. Sensitivity tests show that these results are robust to variations in model specifications, control variable definitions, and possible self-selection bias. Our findings suggest that the Big 5 may adopt different pricing strategies in accordance with their power in a particular market. These findings support the notion that the audit fee premium is partially attributable to a lack of competition in the auditing market.

We contribute to the literature by providing empirical evidence on this issue through a direct comparison of two audit markets in which the Big 5 have different levels of market dominance. Our test setting consists of two sub-markets in which the Big 5 enjoy a brand

name reputation, but they dominate only one. We also interview auditors from the Big 5 and find that their audits of financial reports in the two markets are very similar in terms of coverage, procedures, and standards. This indicates that the difference in the fees charged to clients in different markets is more likely to be attributable to a difference in pricing strategies, rather than cost differences. The special setting allows us to make a contribution to the understanding of audit pricing. However, we accept that the emerging and transitional nature of this market may reduce the power of our analysis because the pricing mechanism and determinants of audit fees may be noisier than those of mature markets, and we take this into consideration in our empirical analyses.

The next two sections provide background information and develop the research hypotheses, respectively. They are followed by a discussion of the research methodology, including the research design, sample selection, and descriptive statistics. The subsequent sections present the main and additional test results, and the last section concludes the paper.

2. Background

Classic economic theory suggests that the prices of goods are positively associated with supplier concentration in the market (Weiss, 1989). However, empirical evidence on the association between audit fee and auditor concentration is inconsistent. Whereas Baber et al. (1987) failed to find any Big 8 audit fee premiums in a study of 100 North Carolina county governments, Ward et al. (1994) found evidence of such premiums in their subsample of Michigan municipalities. Using observations from the insurance industry, Pearson and Trompeter (1994) found market concentration to be negatively associated with audit fees, and suggested that higher levels of concentration are related to higher levels of price competition. Taking advantage of a change in professional rules in Australia that occurred between 1982 and 1987, Craswell, Francis, and Taylor (1996) showed that Big 8 fee premiums declined over a six-year period, and rejected allegations that fee premiums result from the relative lack of competition in the audit market. Bandyopadhyay and Kao (2001) found that Big 6 firms command audit fee premiums even after the removal of certain market barriers, which suggests that such fee premiums reflect brand name reputation, rather than oligopoly rents. In a local analysis, Bandyopadhyay and Kao (2004) obtained mixed results on the relation between market structure and audit fees, showing that the concentration of the audit market is positively associated with non-Big 6 audit fees but is unrelated to Big 6 audit fees. The question of whether the audit fee premium of the Big 5 is a result of oligopoly rents or brand name reputation remains unanswered, and it is likely that the answer will only become apparent when the impact of brand name or quality on audit pricing can be reliably separated from the effect of market dominance. Unfortunately, such a test setting has been hardly available to researchers. The test settings in the aforementioned studies, for example, do not allow us to directly compare Big 5 pricing in an uncompetitive market versus a competitive market. The change in competitive conditions caused by new regulations and examined by Bandyopadhyay and Kao (2001), for example, is unlikely to reflect a real change in the audit market (Thornton, 2001). As the Big 5 dominate the audit market in all of the settings that are examined by these studies, it is difficult to test whether the auditor-fee premium is caused by this dominance. Lee (1996)

Table 1
Big 5 auditors market statistics

Year	Number of B-share firms	Statutory audit market			Supplementary audit market		
		Market share based on			Market share based on		
		#	# of clients	Client assets	#	# of clients	Client assets
1995	70	15	21.40%	14.70%	56	80.00%	80.30%
1996	85	20	23.50%	18.30%	68	80.00%	80.70%
1997	102	28	27.50%	23.00%	91	89.20%	92.70%
1998	102	27	26.50%	21.20%	85	83.30%	89.60%
1999	108	25	23.20%	21.10%	82	75.90%	86.20%
2000	114	28	24.60%	22.00%	80	70.20%	77.10%
2001	112	37	33.00%	34.80%	77	68.80%	76.80%
2002	111	31	27.90%	34.10%	68	61.80%	74.20%
2003	109	30	27.50%	36.40%	57	52.30%	69.50%
1995–2003	913	241	26.40%	26.80%	664	72.70%	79.70%

reviewed the extant audit-pricing literature and pointed out that even though the Big 5 possess less market share in the small-client market than in the large-client market, their total market share is still far higher than that of non-Big 5 auditors. Lee concluded that there is no effective way to separate oligopoly pricing power from the service quality or reputation premium. The validity of previous findings is further weakened by the simultaneous provision of auditing and consulting services to the same client, because joint fee decisions and possible cross-subsidization could severely reduce the reliability of the audit fee data that are used.

Our test setting provides an opportunity to study audit pricing of the Big 5 in two markets in which the effect of market power and reputation can be reasonably separated. Most listed companies in China issue only A-shares to domestic investors, but some (about 10%) also issue B-shares to overseas investors. According to Chinese stock market regulations, companies that issue both A- and B-shares² are required to publish two sets of financial statements in accordance with Chinese GAAP and international accounting standards (IAS and now IFRS). These companies are subject to dual audits, the second of which is performed either by a local auditor or an international CPA firm. As IAS-based statements must be published in Hong Kong for overseas investors that are from areas where the Big 5 are major market players, the auditing of B-share financial statements has become one of the main business areas of the Big 5 in China. Although non-Big 5 overseas firms and local firms are allowed to practice in the Chinese B-share audit market, they do not pose a competitive threat, as regulators prefer the Big 5.³ The Big 5 auditors' market

² Few companies issue only B-shares.

³ The preference of the regulators for international firms is specified in many official regulations, announcements, and interpretations. One of the earliest regulations was promulgated by the Security Committee of State Council in 1996 as a Practice Guide to listed companies. Later, the Chinese Securities Regulatory Commission (CSRC) stipulated in 1999 that all banks and companies in the financial sector were subject to a supplementary audit by "recognized international CPA firms." The regulations for non-financial companies were less restrictive, but the preference for well-known international accounting firms was made very clear by the CSRC in an official document that was issued at the end of 2001.

statistics that are presented in Table 1 show the degree of concentration in the statutory and supplementary markets between 1995 and 2003. It can be seen that the degree of concentration is consistently different in the statutory and supplementary markets. When we use the number of clients to measure market share, we find that the Big 5 possess a share of 26.4% of the statutory market and 72.7% of the supplementary market. However, when market share is measured by the total amount of client assets, the Big 5 hold 26.8% and 79.7% of the statutory and supplementary market share, respectively. This indicates that the Big 5 have focused on large clients in recent years.

Ideally, the audit-pricing practices that we are dealing with in this study should be assessed by comparing two markets (sub-markets), only one of which is concentrated and has entry barriers, to verify whether the fee premium is associated with market competitiveness. The binary market structure in China provides just such a testing opportunity. Its two markets are significantly different both in terms of market concentration⁴ and barriers to entry (the regulatory preference for internationally recognized firms applies only in the supplementary market), but auditors in both markets must follow the same standards and are subject to similar regulatory monitoring. Consequently, we find from our interviews with auditors that firms that audit both A- and B-share statements usually follow the same procedure and have a similar cost function for the two audits.

The Chinese auditing market also possesses other features that make it a valuable setting in which to test audit pricing. First, as they are restricted by an earlier regulation that banned CPA firms from setting up offices in other cities, Chinese auditors usually operate only in the local market. Thus, we do not need to rely on the unsupported premise that audit firms that dominate nationally are major players in a particular local market. Previous studies have often encountered problems with this premise, as it does not hold when there is regional heterogeneity (Bandyopadhyay & Kao, 2004). Second, consulting is not a major business for Chinese firms, which makes audit fee data from China more reliable than data from markets in which auditing and consulting fees may be jointly determined. Third, because Chinese CPA firms have not developed any clear industry specialization, the test setting is cleaner than the settings that are used in other studies in which the effect of industry specialization mingles with that of pricing strategies.

3. Research hypotheses

3.1. Statutory auditing market

China is potentially one of the world's largest auditing markets. However, when the country opened its doors to the then Big 8 firms in the early 1980s, these firms were only allowed to set up representative resident offices, rather than branches, which is the normal arrangement in other markets. The Big 8 were not allowed to fully enter the auditing market until the mid-1980s through the formation of cooperative firms (a type of joint venture) with local partners. The Big 8 firms started their business in China with a very high profile and a reputation that could not be matched by local firms. For example, the top managers

⁴ On average, it is less than 30% in the statutory market and more than 70% in the supplementary market for the Big 5 auditors.

from the big auditing firms had the opportunity to meet with China's Premier during their visits to China, which is a great honor in Chinese culture, whereas their local counterparts had no chance of even meeting a minister. The support of top government officials effectively endorsed the reputation of the big firms for high-quality auditing, but in the statutory audit market local firms had the advantage of a wide network that could not be immediately established by the newcomers. In this regard, the late entrance of the (now) Big 5 into the market has forced them to operate from a relatively disadvantageous position compared to local firms, and although they enjoy a brand name reputation that has overshadowed local firms from the start,⁶ their ability to earn a fee premium is limited by several institutional constraints.

One of these constraints is that auditing services are treated as classical experience goods, as it is difficult to evaluate the quality of a service before using it (Craswell & Francis, 1999). Attracting potential customers when the quality of a good is unknown is challenging for suppliers of high-quality and high-priced experience goods. To overcome this problem, suppliers in mature markets usually build a clientele over a long period by developing a reputation for providing high-quality services and expertise in particular areas. However, in the emerging audit market of China, reputation for high quality is recognized mainly through regulatory requirements, rather than market competition. The requirement of a supplementary audit for overseas investors, which regulators expect one of the big firms to perform, is an effective endorsement of the reputation of those firms, but no similar preference is given in the statutory market. In terms of regulations, therefore, the statutory audit market is equally open to the Big 5 and local firms.

In the emerging market of China, competition is mainly focused on price, rather than on quality or specialization (Li & Wu, 2004). During the 1990s, there were about 100 local CPA firms that were authorized to audit listed companies, but none of them established a leading position in the market. Competition in the marketplace is fierce, as is indicated by the fact that the top ten firms account for less than 35% of the statutory audit market. Companies that are required to undergo statutory audits have little incentive to seek high-quality audits, since this may lead to unfavorable audit opinions (DeFond, Wong, & Li, 2000). Thus, the Big 5 must compete with local firms for clients not only on reputation and audit quality, but also on price. As recent arrivals in the competitive and price-sensitive statutory market, the Big 5 are unlikely to charge a premium. This leads to our first hypothesis.

H1. *Ceteris paribus*, the pricing of the Big 5 is not significantly higher than that of the non-Big 5 auditors in China's statutory auditing market.

3.2. Supplementary auditing market

Whether the audit fee premium that is enjoyed by the Big 5 results from their brand name reputation or represents oligopoly rents is a key issue in many audit fee studies. Previous studies (for example, Bandyopadhyay & Kao, 2001; Francis & Simon, 1987) examined the

⁶ The big firms made significant efforts to enhance their reputation long before China opened its doors to outside suppliers of audit services. In 1981 for example, with assistance from the Shanghai Institute of Finance and Economics, Coopers & Lybrand offered several accounting courses to CFOs, even though no international firms were allowed to practice in China.

pricing of the Big 6 before and after changes in the degree of competition, and, observing a continued fee premium, concluded that the premium is associated with brand name reputation because oligopoly rents would have dissipated in the face of heightened competition. The test setting that is used in these studies, however, suffers from the limitation that the dominant power of the Big 6 might not have experienced a substantial change in the period immediately following the research event.

However, China's supplementary audit market is a reliable sub-sample as a contrast to the statutory market, in which the Big 5 may enjoy the benefits of brand name reputation but not dominant market power. Supplementary audits are usually performed by recognized international firms, mainly the Big 5 or their joint ventures. Although local firms are not legally banned from recruiting clients in this market, their lack of overseas recognition makes it difficult for them to compete with the Big 5. In addition, influential regulators and government officials prefer Big 5 auditors in this market, and emphasize that recruiting Big 5 auditors helps the country to adopt "internationally accepted practices".¹⁰ Although the Big 5 face some competition from local firms, their comparative advantage as suppliers of internationally recognized services is not likely to wane because of low-price competitors. This barrier to entry is different from the barriers that are found in other markets, which are usually enforced by the market itself, rather than the regulators, but the economic consequences are similar. In light of this fact, we anticipate that the Big 5 earn a significant auditor fee premium in the supplementary audit market in which, on average, they hold over 70% of the market share.

H2. *Ceteris paribus*, the Big 5 earn a significant audit fee premium in the supplementary auditing market compared with the non-Big 5 auditors.

Note that H2 does not rule out the possibility that B-share investors have a different level of demand for quality audits than A-share investors. If this is the case, then the fee premium that is charged by the Big 5 in the supplementary market can also be attributed to their reputation (a detailed discussion and analysis of this issue is provided later). Following our earlier argument, we believe that in the long run the market power and quality of auditors are interdependent. However, it is likely, especially in emerging markets such as China, that either market power or reputation alone is sufficient to earn a fee premium in the short run. Our understanding of the institutional arrangements of the Chinese auditing market is that managers in the B-share market have little incentive to hire quality auditors for three reasons. First, raising additional capital after the IPO is effectively impossible in the B-share market. One of the major Chinese financial newspapers, *Securities Time*, concluded in a review of share-issuing status that the B-share market had lost its attraction among both institutional and individual investors, which explains why no B-share companies have issued any additional shares in recent years (May 31, 2002). Consequently, managers have little incentive to signal to the market the accuracy of their financial statements through quality audits. Second, B-share companies raise debt capital mainly from domestic banks (overseas borrowing is strictly controlled by the central bank). Due to the tight control of the central government, domestic banks have very little power to change interest rates. This means that all companies borrow funds at a similar cost, and the only differential is that

¹⁰ "Adopting internationally accepted practices" was the slogan that was used by the Chinese government in its accounting reform campaign of 1993.

risky companies may need to pledge more assets to guarantee their borrowing. Again, the effect of audit quality on reducing borrowing costs is practically negligible. Third, corporate control in the B-share companies is mainly determined by the government or its representative organizations (business groups). Holders of B-shares have virtually no influence over the appointment or removal of managers, and thus managers are not likely to employ quality auditors even if their foreign shareholders demand it.

Note also that confirmation of H2 alone will not provide sufficient evidence that the Big 5 enjoy high audit fees primarily because of their dominant position in the market. To understand the underlying reasons for the pricing strategy of the Big 5, we must analyze H1 and H2 together. As the Big 5 use similar auditing procedures and cost functions in both the statutory and supplementary markets, the simultaneous confirmation of H1 and H2 will suggest that the Big 5 do not earn an audit fee premium in a competitive market, but do earn such a fee when they face less competition.

4. Research methodology

4.1. Research design

Our hypotheses are tested using ordinary-least-squares (OLS) models with audit fees as the dependent variable and whether or not a firm is a Big 5 auditee as the experimental variable. Based on previous research (for example, Craswell & Francis, 1999; Simunic, 1980) and the characteristics of the B-share market, we identify the following control variables. (1) The size of client assets and the number of consolidated subsidiaries, which control for differences in audit workload and complexity, respectively; (2) audit risk proxies, including the ratio of accounts receivable to total assets, the ratio of inventory to total assets, loss-reporting status, leverage ratio, the ratio of non-operating profit to net profit, and audit opinion; (3) auditor change from Big 5 to non-Big 5 (B5TNB5); (4) the geographical region in which the company operates, which controls for the impact of differences in economic development level on auditor fees; and (5) a year dummy variable to control for changes in the auditing environment over our testing period.

It is possible that the audit quality that is demanded by local investors (holders of A-shares) is systematically lower than that which is expected by foreign investors that hold B-shares. If this is the case, then Chinese companies may be willing to pay a higher fee for B-share (supplementary) audits to meet investor expectations. Although our earlier discussion indicates that foreign investors cannot effectively influence management, as part of our control for this demand-induced pricing difference we introduce two additional control variables. The first is the percentage of foreign shares (tradable B-shares and non-tradable initial foreign shares) to total outstanding shares (FLTOTAL), and the second is the ratio of total shares that are held by foreign shareholders (tradable B-shares and non-tradable initial shares) that rank among the top 10 shareholders to shares that are held by the largest shareholder (FI_CTRL). The first variable controls for the possibility that foreign investors may have a greater demand for quality audits, and the second controls for differences in agency costs in terms of the relative monitoring power of foreign investors over the largest shareholder that could affect the audit fee. Increased monitoring power on the part of foreign investors is expected to reduce agency costs (Gul, Chen, & Tsui, 2003).

4.2. Model

We estimate the following linear model.

$$\begin{aligned} \text{LAF}_i = & b_0 + b_1 \text{LTA} + b_2 \text{SQSUBS} + b_3 \text{RECV} + b_4 \text{INV} + b_5 \text{LEV} + b_6 \text{LOSS} \\ & + b_7 \text{EXTRGAIN} + b_8 \text{OP} + b_9 \text{B5TNB5} + b_{10} \text{AREA} + b_{11} \text{FI TOTAL} \\ & + b_{12} \text{FLCTRL} + b_{13} \text{Y01_03} + b_{14} \text{BIG5}_i + e. \end{aligned}$$

This model is estimated for statutory audits (Model 1) and for supplementary audits (Model 2).

where the following notation applies.

t	statutory (statu) in model (1) for sample firms in the statutory auditing market, and supplementary (supply) in model (2) for firms in the supplementary auditing market.
LAF	the natural log of audit fees that are disclosed in the annual report.
LTA	the natural log of total assets at the end of period t .
SQSUBS	the square root of the number of subsidiaries consolidated.
RECV	the ratio of accounts receivable to total assets at the end of period t .
INV	the ratio of inventory to total assets at the end of period t .
LEV	the ratio of total liabilities to total assets at the end of period t .
LOSS	one if the reported net income for period t is negative, and zero otherwise.
EXTRGAIN	non-operating income/absolute value of net income.
OP	one for a modified audit opinion, and zero otherwise.
B5TNB5	one if the auditor changes from a Big 5 to a non-Big 5 firm during the period, and zero otherwise.
AREA	one if the company is based in one of the four more developed Chinese cities (Beijing, Shanghai, Shenzhen, or Guangzhou), and zero otherwise.
FI TOTAL	(total B-shares + initial non-tradable foreign shares) total shares.
FLCTRL	the shares that are held by (a) holders of B-shares and (b) holders of non-tradable foreign initial shares that rank among the top-10 shareholders number of shares held by the largest shareholder.
Y01_03	one if the observation falls within the period 2001 and 2003, and zero if the observation falls in 2000.
BIG5	one if a firm is a Big 5 auditor or one of their joint ventures, and zero otherwise.

Based on regression models (1) and (2), we estimate the coefficient b_{14} for the main explanatory variable BIG5 for the statutory and supplementary audit markets, respectively.

4.3. Sample selection

In 2001, Chinese listed companies were required to disclose audit fees for the current and previous years in their annual reports for the first time. This allows us to obtain the data

that we need for this study. To test our hypotheses, we hand-collected statutory and supplementary audit fees from the 2000 to 2003 annual reports of B-share companies. Companies were excluded from the sample if their statutory and supplementary audit fees were not disclosed separately, or if fees for other services could not be identified separately. Following the procedure that is described in Panel A of Table 2 we obtained a paired sample with 217 observations in each market. Details of the composition of the sample are presented in Panels B and C. Panel B shows that the Big 5 auditors account for only 12.4% (27/217) of the statutory market sub-sample, which is substantially lower than their actual market share of about 26%. Since about half of the Big 5 auditors do not separately disclose the audit fees they collect from single clients for both the statutory and supplementary audits, they are excluded from our sample. As is shown in Panel C of Table 2, in the supplementary audit sub-sample the Big 5 auditors account for 70.5% (153/217) of the

Table 2
Sample selection procedure and sample composition

Panel A: sample selection procedure

Year	2000	2001	2002	2003	Total
Total B-share companies	114	112	111	109	446
Companies that disclosed an audit fee ^a	58	95	100	100	353
Less: Lack of separate disclosure	17	33	39	40	129
Partial disclosure only	1	2	2	2	7
Total sample observations	40	60	59	58	217

The difference between the total B-share companies and companies that disclosed an audit fee is caused by several factors: failure to disclose relevant information, uncertainty about the disclose period, or inability to reasonably identify and separate the non-annual-audit component from the total audit fee.

Panel B: sample composition of the statutory audit market

Year	Big 5						Non-Big 5	Total
	AA	DTT	EY	KPMG	PWC	Total		
2000	0	1	0	0	1	2	38	40
2001	2	2	0	1	3	8	52	60
2002		3	0	1	4	8	51	59
2003		3	0	1	5	9	49	58
Total	2	9	0	3	13	27	190	217

Panel C: sample composition of the supplementary audit market

Year							Non-Big 5					Total	
	Big 5						Big 3			Other non-local	Local		Non-Big 5 total
							BDO	Horwath	Grant Thornton				
	AA	DTT	FY	KPMG	PWC	Total							
2000	8	3	7	3	13	34	2	2	0	2	0	6	40
2001	11	3	8	5	19	46	2	4	1	6	1	14	60
2002		3	5	5	29	42	1	7	1	7	1	17	59
2003		3	3	4	21	31	6	8	1	12	0	27	58
Total	19	12	23	17	82	153	11	21	3	27	2	64	217

Group B dummy variable	Observation [weight]	Observation [weight]	Observation [weight]	Pearson chi-square	Observation [weight]	Observation [weight]	Pearson chi-square
LOSS (= 1)	34 [15.7%]	4 [14.8%]	30 [15.8%]	0.017	34 [15.7%]	18 [11.8%]	5.982**
OP (= 1)	32 [14.7%]	1 [3.7%]	31 [16.3%]	2.991*	33 [15.2%]	19 [12.4%]	3.130*
B5TNB5 (= 1)	3 [1.4%]	N/A	3 [1.6%]	N/A	14 [6.5%]	N/A	N/A
AREA (= 1)	145 [66.8%]	15 [5.5%]	130 [68.4%]	1.765	145 [66.8%]	89 [58.2%]	17.509***
Y01_03 (= 1)	177 [81.6%]	25 [9.2%]	152 [80.6%]	2.493	177 [81.6%]	119 [77.8%]	4.954**
BIG5 (= 1)	27 [12.4%]	N/A	N/A	N/A	153 [70.5%]	N/A	N/A
Sample size	217	27	190		217	153	64

***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

1 HKD = 1.06 RMB, 1 USD = 8.28 RMB

AF = audit fees disclosed in the annual report (in thousand RMB)

LAF = the natural log of audit fees disclosed in the annual report

LTA = the natural log of total assets at the end of period t

SQSUBS = the square root of the number of consolidated subsidiaries

RECV = the ratio of accounts receivable to total assets at the end of period t

INV = the ratio of inventory to total assets at the end of period t

LEV = the ratio of total liabilities to total assets at the end of period t

LOSS = one if the reported net income for period t is negative, and zero otherwise

EXTRGAIN = non-operating income absolute value of net income

OP = one for a modified audit opinion, and zero otherwise

B5TNB5 = one if the auditor changed from a Big 5 to a non-Big 5 auditor during the period, and zero otherwise

AREA = one if the company is based in one of the four more developed Chinese cities (Beijing, Shanghai, Shenzhen, or Nanjing), and zero otherwise

FLTOTAL = (total B-shares - initial non-tradable foreign shares) / total shares

FLCTRL = shares held by (a) holders of B-shares and (b) holders of non-tradable foreign initial shares that rank among the top 10 shareholders number of shares held by the largest shareholder

Y01_03 = one if the observation falls between 2001 and 2003, and zero for observations that fall in 2000

BIG5 = one for a Big 5 auditor or one of their joint ventures, and zero otherwise

observations, which closely corresponds to their actual market share. Panel C also shows that two U.S.-based firms (BDO and Horwath) have begun to pick up market share in recent years.

4.4. Descriptive statistics

Table 3 reports the descriptive statistics of the total sample, the Big 5 sub-sample, and the non-Big 5 sub-sample for statutory and supplementary markets, respectively.

In the statutory market, the Big 5 charge an average audit fee of RMB 481,230 and the non-Big 5 auditors charge RMB 416,260, which is not statistically different from the price that the Big 5 charge. However, in the supplementary market, the Big 5 earn an average of RMB 771,710, which is significantly higher than the fee of RMB 405,710 that is charged by the non-Big 5 firms (t -value = 10.407, p -value = 0.000). A Mann–Whitney test indicates a significant difference in audit fee distribution in the supplementary market, but no such difference in the statutory market. These results from the univariate comparisons are consistent with our hypotheses.

Table 3 also indicates that there is no significant difference in the statutory market between the clients of the Big 5 and the clients of the non-Big 5 auditors in terms of size, risk, and profitability. However, Big 5 clients in the supplementary market are larger, less complex, less risky, and may have fewer managed components in their reported profit than the clients of the non-Big 5 auditors. This suggests that the Big 5 have better clients and charge more, which indicates that they enjoy a market power that is unmatched by local auditors.

5. Empirical results of models (1) and (2)

Table 4 shows that our models have significant explanatory power, as indicated by a significant F -statistic and adjusted R^2 of 0.495 and 0.672 for models (1) and (2), respectively. The Durbin–Watson test shows that neither model is auto-correlated. Collinearity test results for the variance inflation factor (VIF) show that none of the dependent variables have a VIF of greater than 2.0. Therefore, multicollinearity is not considered to be a problem for either model.

Table 4 reports the regression results of models (1) and (2). In model (1) (statutory market), the coefficient on the experimental variable Big 5 is -0.018 (t -value = -0.212), which indicates that the Big 5 do not earn a significant audit fee premium compared to the non-Big 5 auditors when all other variables are controlled. In model (2) (supplementary market), the Big 5 variable has a coefficient of 0.535 that is significant at the 0.001 level, which indicates that, on average, the audit price charged by the Big 5 is significantly higher than that charged by the non-Big 5 auditors in the supplementary market.

The results show that client asset size (LTA) and audit complexity (SQSUBS) are significantly positive, which suggests that audit fees increase with client size and audit complexity. LEV is significant and positive, which indicates that auditors tend to charge more if their clients rely more on debt financing. Another variable that is significantly negative for both markets is the relative control of foreign investors over the largest shareholder (FLCTRL), which suggests that agency costs are relatively low when foreign investors have more control. This result can be explained by the fact that foreign investors

are more likely to pursue firms with low agency costs in forming a portfolio, as foreign investors in China cannot effectively influence the management of the firms in which they invest. Some of the variables are significant only for the supplementary market. Companies with more receivables and loss-making companies pay higher fees to auditors, which indicates that risk in this market carries a price. CPA firms in major cities are more likely to compete on price because they face more competition, and clients with more foreign investors tend to pay more, probably because they can afford to do so. These results suggest that audit pricing in the supplementary market is more consistent with the findings of previous studies that use data from developed markets. The negatively significant coefficient on audit opinion (OP) is difficult to interpret, but a further comparison of companies with modified opinions and those with clean opinions reveals that companies receiving modified opinions tend to be smaller, poor financial performers, and unable to pay high fees. This may explain to an extent why audit opinion is negatively associated with audit fees in our sample. Overall, these results support both hypotheses 1 and 2.

6. Further tests

6.1 Differentiation of client asset size

Previous research (Chaney, Jeter, & Shivakumar, 2004; Francis & Simon, 1987; Francis & Stokes, 1986; Lee, 1996) documents that client size is positively associated with Big 5

Table 4
Regression results for models (1) and (2)

Dependent variable:	Model (1) (α = statutory audit)		Model (2) (α = supplementary audit)	
LAF	Coefficient	t-value	Coefficient	t-value
Intercept	-1.156	-2.596***	-1.267	-3.319***
Control variable				
LTA	0.363	11.079***	0.369	12.886***
SQSUBS	0.081	3.938***	0.088	3.352***
RECV	0.214	1.048	0.706	4.025***
INV	-0.349	-2.131**	0.110	.766
LEV	0.127	2.514**	0.073	1.654*
LOSS	-0.089	-0.725	0.132	1.866*
EXTRGAIN	0.009	0.140	0.013	1.274
OP	-0.055	-0.654	-0.139	-1.946*
B5TNB5	0.001	-0.006	0.076	.758
AREA	0.016	0.256	-0.202	3.747***
FLTOTAL	0.029	0.108	0.671	2.899***
FLCTRL	-0.127	-1.683*	-0.108	-1.726*
Y01_03	0.101	1.484	0.004	.072
Experimental variable				
BIG5	-0.018	-0.212	0.535	8.252***
Sample size	217		217	
F-statistic	16.146***		32.666***	
Adj. R ²	0.495		0.672	

***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively

All of the variables are as defined in Table 3

audit pricing. The large-client market does not leave much room for small audit firms to compete, as they usually do not have the expertise or resources to meet the demands of large clients. As the Big 5 often compete with each other in this market, they are less likely to earn a significant fee premium, but in the more competitive small-client market the Big 5 compete both with each other and with smaller firms with lesser reputations and audit quality. This advantage allows the Big 5 to earn a significant fee premium. To control for the difference in pricing strategies that results from market differentiation, we separate the statutory and supplementary auditing markets further by the median of total client assets, which is RMB 2,029,330,000, following Craswell, Francis, and Taylor (1995).

We re-estimate models (1) and (2) with the sample thus separated, and the results (not tabulated) indicate that in the statutory auditing market the Big 5 do not earn a premium from either large clients or small clients. However, in the supplementary auditing market (model (2)), the Big 5 earn a significant fee premium from both small and large clients. This premium is more significant in the large firm sub-sample, which supports the notion that the Big 5's premium is less likely to be determined by client size than by market competition.

6.2. Pricing of the Big 5 and non-Big 5 auditors in the statutory and supplementary markets

Models (1) and (2) are designed to compare the pricing strategies of auditors in the same market (either statutory or supplementary). To compare the same auditor's pricing in different markets, we re-estimate models (1) and (2) by changing the experimental variables from Big 5 to BIG5_{suppl} in model (1) and NONBIG5_{suppl} in model (2) to verify whether non-Big 5 auditors also have different pricing strategies in the statutory and supplementary markets. If non-Big 5 auditors expect more from their clients in the supplementary market, as is the case with the Big 5, then we may conclude that the premium that is earned in this market is related to higher labor costs or return on investment requirements. However, if non-Big 5 auditors use similar pricing strategies in the two sub-markets and earn no premium in the supplementary market, then this would provide evidence for attributing the premium of the Big 5 to their dominant market position. The revised model (1) is tested on a sample of 180 Big 5 observations, including 27 from the statutory market and 153 from the supplementary market. Revised model (2) is tested on a sample of 254 non-Big 5 observations, of which 190 are from the statutory market and 64 from the supplementary market.

The results of this test (not tabulated) show that the main explanatory variable BIG5_{suppl} is positively related to audit pricing at the 0.001 significance level, whereas NONBIG5_{suppl} is not significantly associated with audit pricing. This suggests that the audit pricing of the Big 5 in the supplementary market is significantly higher than it is in the statutory market; however, the audit fees of the non-Big 5 auditors are not significantly different in the statutory and supplementary markets. Combining this finding with the earlier results, we find that not every audit firm can earn a fee premium in the supplementary market, and that the Big 5 earn a premium only in the supplementary audit market, in which they have strong market power. We cannot completely rule out the possibility that this strong market power is based on the quality of the audits that are provided by the Big 5 or their brand name reputation, but our findings tend to support the notion that the Big 5 are more likely to earn a fee premium when they have strong market power.

Table 5
Regression results for models (3) and (4)

Dependent variable: LAF	Model (3): all supplementary auditors		Model (4): Big 5 supplementary auditors	
	Coefficient	t-value	Coefficient	t-value
Intercept	-1.285	-3.363***	0.899	-1.540
Control variable				
LTA	0.371	12.926***	0.378	9.106***
SQSUBS	0.060	3.410***	0.052	2.350**
RECV	0.724	4.105***	0.694	2.828***
INV	0.106	0.744	0.043	0.257
LEV	0.071	1.608	0.288	2.336**
LOSS	0.128	1.794*	0.046	0.446
EXTRGAIN	0.013	1.284	0.009	0.374
OP	-0.137	-1.916*	0.098	1.001
B5TNB5	0.080	0.794	N/A	
AREA	-0.194	3.552***	0.148	-2.210**
FLTOTAL	0.614	2.570**	0.587	1.748*
FLCTRL	-0.097	-1.514	-0.045	-0.579
Y01_03	0.000	0.002	0.011	0.160
Experimental variable				
BIG5_HK	0.510	7.391***	-0.062	-1.026
BIG5_ML	0.567	7.858***		
Sample size	217		153	
F-statistic	30.561***		14.044***	
Adj. R ²	0.672		0.527	

***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Results are obtained from models (3)–(4).

$$\text{LAF} = b_0 + b_1\text{LTA} + b_2\text{SQSUBS} + b_3\text{RECV} + b_4\text{INV} + b_5\text{LEV} + b_6\text{LOSS} + b_7\text{EXTRGAIN} + b_8\text{OP} \\ + b_9\text{B5TNB5} + b_{10}\text{AREA} + b_{11}\text{FLTOTAL} + b_{12}\text{FLCTRL} + b_{13}\text{Y01_03} + b_{14}\text{BIG5_HK} \\ + b_{15}\text{BIG5_ML} + e.$$

$$\text{LAF} = b_0 + b_1\text{LTA} + b_2\text{SQSUBS} + b_3\text{RECV} + b_4\text{INV} + b_5\text{LEV} + b_6\text{LOSS} + b_7\text{EXTRGAIN} + b_8\text{OP} \\ + b_9\text{AREA} + b_{10}\text{FLTOTAL} + b_{11}\text{FLCTRL} + b_{12}\text{Y01_03} + b_{13}\text{BIG5_HK} + e.$$

BIG5_HK = one if the supplementary auditor is the Hong Kong representative of a Big5 auditor, and zero otherwise.

BIG5_ML = one if the supplementary auditor is the mainland Chinese joint venture of a Big 5 auditor, and zero otherwise.

All of the variables are as defined in Table 3.

6.3. The difference between local joint venture Big 5 and Hong Kong Big 5 in the supplementary market

In the statutory market the Big 5 are usually represented by their mainland Chinese joint ventures, whereas in the supplementary market they are mainly represented by their Hong Kong office. However, according to Li and Wu (2003), of the financial statements that were audited by the Big 5 in the supplementary market from 1999 to 2001, 59% were disclosed as having been audited by the Hong Kong office and 41% by the local joint venture. The number of local joint

venture Big 5 auditors in the supplementary market increased to 69% in 2002 and 2003. The availability of data on local joint venture Big 5 versus Hong Kong Big 5 in the same market allows us to compare their pricing practices. It is possible that the local joint venture Big 5 have a poorer reputation and lower labor costs than the Hong Kong Big 5. If this is so, then it may be the cause of the pricing difference between the two markets. If local joint venture Big 5 and Hong Kong Big 5 charge a similar fee in the same supplementary market, then we can conclude that the difference in the fees charged by the Big 5 in the two markets cannot be explained by a difference between the reputation or labor costs of the joint venture Big 5 and Hong Kong Big 5.

We modify model (2) to construct models (3) and (4) by introducing two new dummy variables (BIG5_HK and BIG5_ML) that are assigned a value of one if an auditor is a Hong Kong-based Big 5 or local joint venture Big 5 firm, and zero otherwise. Model (3) is estimated with the supplementary market sub-sample, which includes clients that are audited by Big 5 and non-Big 5 auditors. Our objective is to examine whether Hong Kong Big 5 and local joint venture Big 5 use different pricing strategies from non-Big 5 auditors. Model (4) is estimated only with Big 5 clients in the supplementary market sub-sample.

Table 5 lists the regression results for models (3) and (4), which have significant *F*-statistics at the 0.001 level and an adjusted R^2 of 0.672 and 0.527, respectively. Significant positive coefficients on BIG5_HK and BIG5_ML for model (3) indicate that both Hong Kong Big 5 and local joint venture Big 5 charge a significantly higher fee than non-Big 5 auditors. The results for model (4) show that the coefficient on BIG5_HK is not significantly different from zero, which suggests that there is no significant difference between the Hong Kong Big 5 and the local joint venture Big 5 in their pricing of supplementary audits. This finding minimizes the probability that the results that we report in Table 4 are subject to the alternative explanation that the employment of different pricing strategies by the Big 5 in the statutory and supplementary markets is caused by differences between the reputation or cost function of the local joint venture and Hong Kong offices.

6.4. *Self-selection bias*

Concerns may be raised about the validity of our research design because of possible self-selection bias (Chaney et al., 2004; Copley, Gaver, & Gaver, 1995; Ireland & Lennox, 2002). The self-selection problem derives from the possibility that companies that select Big 5 auditors are systematically different from the clients of local auditors, and, more importantly, that the difference between Big 5 and non-Big 5 clients in the supplementary market is different from that in the statutory market. If this is the case, then it is possible that the clients of the Big 5 are not significantly different from the clients of the non-Big 5 auditors in the statutory market, which might explain why no fee premium is found. Conversely, if the clients of the Big 5 are significantly different from the non-Big 5 clients in the supplementary market, then it could be suggested that these clients have an inherent demand for Big 5 auditors even if a fee premium is charged.

The self-selection problem is usually addressed using the Heckman (1976) method. However, the regular Heckman method deals with self-selection between two choices, whereas our test setting is more complicated because it involves two parallel choices that are made for different reporting purposes (A- and B-share reporting) in different settings (the statutory and supplementary markets). Given that the Heckman method is not readily applicable

to our overall sample, we apply it in the statutory and supplementary markets separately to control for self-selection bias in each market. First, we build a probit model with variables that are identified as being associated with the selection of a Big 5 auditor. We compute the Inverse Mills Ratio (IMR) from the probit model based on Heckman (1976), and use it as an additional control variable in the subsequent comparison of the difference in audit fees between the Big 5 and non-Big 5 auditors to correct for any bias that is caused by self-selection into the Big 5 subsample by certain firms (Heckman, 1976; Johnston & DiNardo, 1997).

Our choice of variables for the probit models is based on previous studies that examined the choice between Big 6 and non-Big 6 auditors in the U.S. (Francis, Maydew, & Sparks, 1999), the literature about auditing in China (for example, Chen, Chen, & Su, 2001), and the interviews that we conducted with Big 5 and local auditors. The probit model is as follows:

$$\begin{aligned} \text{Pr}(\text{BIG5}_{it} = 1) = & c_0 + c_1\text{BETA}_{it-1} + c_2\text{CPINT}_{it-1} + c_3\text{OPCYCLE}_{it-1} \\ & + c_4\text{LOSS}_{it-1} + c_5\text{ROA}_{it-1} + c_6\text{SALESGRWTH}_{it-1} \\ & + c_7\text{LTA}_{it-1} + c_8\text{SQSUBS}_{it-1} + c_9\text{RECV}_{it-1} \\ & + c_{10}\text{EXTRGAIN}_{it-1} + c_{11}\text{AREA}_{it-1} + c_{12}\text{FLTOTAL}_{it-1} \\ & + c_{13}\text{FLCTRL}_{it-1} + c_{14}\text{NONTRADE}_{it-1} + c_{15}\text{Y2001}_{it} \\ & + c_{16}\text{Y2002}_{it} + c_{17}\text{Y2003}_{it} + \mu_i \end{aligned}$$

where the following notation is used.

BIG5	Big 5 Auditor, which takes the value one if an auditor is one of the Big 5, and zero otherwise.
BETA	The beta that is estimated by the market model.
CPINT	Capital Intensity: Gross fixed assets/sales
OPCYCLE	Operating Cycle: $[365 * (\text{average inventory} / \text{cost of goods sold}) + 365 * (\text{average accounts receivable} / \text{sales})] / 30$.
LOSS	one for net income that is negative, and zero otherwise.
ROA	annual net income over initial total assets.
SALESGRWTH	Sales growth: $(\text{sales in year } t - \text{sales in year } t-1) / \text{sales in year } t-1$.
LTA	the natural logarithm of total assets.
SQSUBS	the square root of the number of consolidated subsidiaries.
RECV	the ratio of accounts receivable to total assets.
EXTRGAIN	non-operating income/absolute value of net income.
AREA	one if the company is based in one of the four more developed Chinese cities (Beijing, Shanghai, Shenzhen, or Guangzhou), and zero otherwise.
FLTOTAL	$(\text{total B-shares} + \text{initial non-tradable foreign shares}) / \text{total shares}$.
FLCTRL	the shares that are held by (a) holders of B-shares and (b) holders of non-tradable foreign initial shares that rank among the top-10 shareholders/number of shares held by the largest shareholder.
NONTRADE	The percentage of non-tradable shares outstanding.
Y2001, Y2002, Y2003	indicator variables for the years 2001, 2002, and 2003, respectively. i and t denote the company and period, respectively.

The selection of the variables CPINT, OPCYCLE, and LTA, is based on the study of Francis et al. (1999). The adoption of the variables LOSS, SQSUBS, RECV, EXTRGAIN, AREA, FI TOTAL, and FI CTRL is based on our understanding of the institutional background in China and their use in models (1) and (2). The selection of the other variables, namely, BETA, ROA, NONTRADE, and SALESGRWTH, are based on knowledge that was obtained through our interviews with the partners of audit firms and managers of listed companies. BETA measures risk, because riskier firms may attract increased scrutiny from auditors and will therefore show less interest in selecting a Big 5 auditor. ROA is the ratio of annual net income over total assets at the previous year-end. Companies with a good performance are more likely to employ a Big 5 auditor to increase the credibility of their reported earnings. Non-tradable shares are shares that are not allowed to be traded in the market. These shares are usually held by, and transferred between, large-block shareholders that are often either government-controlled entities or large state-owned enterprises. On average, over 60% of the shares during our testing period were non-tradable. The percentage of outstanding non-tradable shares proxies for government control of a firm. Usually, managers in government-controlled firms have less need to communicate with investors, as these firms depend less on the market for finance and receive government protection from regulators and investors. We therefore expect the managers of firms with more non-tradable shares to show a lower propensity to select high-quality auditors. Firms that have not achieved any growth in sales have more incentive to inflate their performance to meet the profit target that is set by the regulator (Chen et al., 2001) and, accordingly, have little incentive to be audited by one of the Big 5. In our model, we employ an indicator variable for each year to control for the year effects.

In the interests of space, the results from the probit models are not tabulated, but they are generally consistent with our expectations. The likelihood ratio is significant (-74 for the supplementary market and -60 for the statutory market), which indicates that the probit models effectively differentiate between Big 5 and non-Big 5 auditors. In the next stage, we re-estimate models (1) and (2) with the addition of the IMR as a variable to control for sample-truncation bias. The results are summarized in Table 6 and are qualitatively similar to those that are reported in Table 4, which suggests that our results are not driven by biased demand in auditor selection.

In addition to employing the Heckman approach, we re-test models (1) and (2) excluding observations of companies with A-share and B-share financial statements that are not audited by auditors from the same groups. There is no difference in auditor selection between the statutory and supplementary markets for the same auditor group,⁴ because all of the underlying firm characteristics and actual use of auditors are identical for all of the firms in this sub-sample. Thus, the observation of a fee premium in the supplementary market but not in the statutory market cannot be attributed to a difference between domestic and foreign investors in the quality of audits that are demanded. There are 26 Big 5 and 28 non-Big 5 auditor groups among 217 pairs of dual audits. Thus we use 54 observations in each market for the test. The results (not tabulated) show that the coefficient on the Big 5 variable is positive but not significant in the statutory market (t -value = 0.83), and positive

⁴ For example, the representative Hong Kong office of a Big 5 auditor such as PWC and its local member firm PWC (Zhongtian) are deemed to be in the same auditor group. Similarly, a non-Big 5 auditor such as the Hong Kong-based Horwath and its local member firm in Shanghai are also viewed as being in the same auditor group.

Table 6
Regression results with control for self-selection bias

Dependent variable: LAF _{<i>i</i>}	<i>i</i> = statutory audit		<i>i</i> = supplementary audit	
	Coefficient	<i>t</i> -value	Coefficient	<i>t</i> -value
Intercept	-1.134	-2.41***	-1.308	-3.37***
Control variable				
LTA	0.363	10.68***	0.362	12.17***
SQSUBS	0.090	3.25***	0.065	3.54***
RECV	0.189	0.88	0.762	4.09***
INV	-0.361	-2.18**	0.068	0.46
LEV	0.127	2.46***	0.082	1.85*
LOSS	0.060	-0.73	0.150	2.05**
EXTRGAIN	0.007	0.58	0.019	1.62
OP	0.056	-0.66	-0.142	-1.97**
B5TNB5	-0.015	0.06	0.054	0.50
AREA	-0.001	-0.02	-0.175	-2.90***
FLTOTAL	0.017	-0.06	0.589	2.44**
FLCTRL	0.114	-1.14	-0.116	-1.80*
Y01_03	0.107	1.50	0.027	0.44
IMR	0.077	0.48	-0.098	-1.18
Experimental variable				
Big5	-0.143	-0.50	0.661	5.26***
Sample size	217		217	
<i>F</i> -statistic	14.86***		29.68***	
Adj. <i>R</i> ²	0.494		0.669	

***, **, * indicate two-tailed significance at the 0.01, 0.05, and 0.10 levels, respectively.

IMR = Inverse Mill's ratio as estimated using Heckman's approach.

All of the other variables are as defined in Table 3.

and significant in the supplementary market (*t*-value = 2.10), which corroborates our findings from models (1) and (2). These results lend more support to our argument that the fee premium is more likely to be attributable to the difference in the market concentration of the two audit markets, rather than a difference in the characteristics of the audit clients.

The selection of an auditor is jointly determined by the forces of supply and demand, and as these forces are interrelated it is difficult to completely disentangle them. In this regard, our efforts to address the selection-bias problem cannot completely rule out the possibility that the forces of demand also affect auditor selection. However, as is stated in our earlier analysis, the usual benefits for investors and managers of selecting a Big 5 auditor in developed markets are either absent or minimal in China. Our results, therefore, are more likely to be attributable to the effects of supply, rather than those of demand, in the Chinese audit market.

6.5. Additional robustness tests

In this section, we discuss the robustness of our findings in relation to variation in research design or variable definition. First, we re-estimate our main models with the first-year audit observations deleted to control for the possibility that first-year pricing is biased because of a low-balling strategy. The results (not tabulated) of 193 observations from the statutory and 191 observations from the supplementary markets are qualitatively similar to

those in Table 4. Therefore, we conclude that our results are not caused by the low-balling of new auditors.

Second, we reconstruct our sample by excluding the same auditor group observations which engage in statutory and supplementary audits for the same client.⁸ Auditors that belong to the same group may coordinate with each other to determine the fees that are charged to shared clients. We conduct this additional test to see whether our findings hold for audits that were carried out by two completely unaffiliated auditors. When CPA firms from the same group are eliminated, only one Big 5 observation and 162 non-Big 5 observations remain from the statutory market, whereas 127 Big 5 observations and 36 non-Big 5 remain from the supplementary market. Since it is difficult to conduct a meaningful test in the statutory market,⁹ we therefore focus on the 163 remaining observations from the supplementary market to verify whether the Big 5 still earn a fee premium in this market compared to non-Big 5 auditors. The coefficient (not tabulated) on the experimental variable (BIG 5) remains significantly positive at the 0.001 level. This suggests that the Big 5 still earn a fee premium in the supplementary market where they enjoy strong market power, which corroborates our main findings.

Third, we conduct a year-by-year analysis of models (1) and (2) to rule out the possibility that repeated observations in our sample have inflated the significance of the coefficients. The results (not tabulated) are consistent with the findings that are reported in Table 4: the Big 5 earn a significant fee premium only in the supplementary market for each year in our testing period.

7. Conclusion

China's emerging capital market consists of the A- and B-share segments. Companies that issue B-shares must prepare two sets of financial statements and are subject to both statutory and supplementary audits. The statutory and supplementary audit markets are significantly different in the degree of market concentration. In the competitive statutory market, the Big 5 auditors hold only about 26% of the market share, but in the supplementary market they boast a market share of over 70%. This domination of the supplementary market by the Big 5 is echoed in most developed markets. Using audit fee data from 2000 to 2003, we find that in the competitive statutory market the Big 5 do not earn a significant audit fee premium, but they do earn a significant audit fee premium in the supplementary market. This finding is robust to different model specifications and variable definitions. Our results suggest that the audit fee premium that is earned by the Big 5 is more likely to be due to their dominant position in the market than their reputation or cost.

This study benefits from the binary structure of the audit market in China, which provides an interesting test setting. However, this distinct setting may also limit the generalizability of our results. It is possible that the Big 5 have developed a pricing strategy that is applicable only to the binary Chinese market. Our results are also subject to the alternative explanation that the discounts that are offered by the Big 5 in the statutory market are part of their efforts to procure clients in the more profitable supplementary

⁸ See footnote 7 for the definition of "same auditor group".

⁹ Due to this sample limitation, we cannot test the possibility that our main results may be biased because of possible joint-pricing decisions that are made by affiliated auditors from the same group in the statutory market.

market. In other words, the low audit fees that are charged in the statutory market are compensated by the high audit fees that are generated in the supplementary market. As the data are limited, we cannot determine whether and how a firm decides its pricing strategy for the two markets, and additional research is needed in this area.

Our interpretation of the main results is constrained by the assumption that the efforts of auditors in statutory and supplementary audits are not significantly different from each other, which is a necessary assumption if the audit fees that are charged in the two markets are to be compared. Although we cannot validate this assumption, anecdotal evidence suggests that auditors in the statutory market are more cautious than auditors in the supplementary market, because the former are responsible for reporting and disclosing scandals that can result in litigation. The possibility that auditors make more effort in the statutory market works against finding significant results that are in line with our hypotheses, and thus in this regard our findings are robust.

Another limitation, which is difficult to overcome, is that the statutory and supplementary auditors of many of our observations from the two markets are affiliated. Although we introduce some robustness tests, it is still possible that the fee premium of the Big 5 has been distorted in the Chinese B-share binary auditing market. For this reason, our results should be interpreted with caution. Nonetheless, this study contributes to the literature by shedding light on the audit-pricing strategies of the Big 5 auditors and on the underlying reasons for the fee premium that they enjoy.

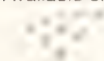
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Accounting for financial instruments: An analysis of the determinants of disclosure in the Portuguese stock exchange[☆]

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Abstract

This paper studies the determinants of disclosure level in the accounting for financial instruments of Portuguese listed companies. An index of disclosure based on IAS 32 and IAS 39 requirements is computed for each company. The analysis includes variables that capture intrinsic features of Portuguese companies and institutional regulatory context, such as capital structure and characteristics of the corporate governance structure, within contingency theory. We could not find any significant influence of corporate governance structure or of financing structure. We conclude that the disclosure degree is significantly related to size, type of auditor, listing status and economic sector. This research reveals areas for improvement of Portuguese companies' reporting practices and suggests areas for intervention of the Portuguese capital markets regulator in the context of mandatory IAS after 2005.

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1. Introduction

This paper studies the determinants of disclosure practices in the accounting for financial instruments by Portuguese listed companies. Considering the mandatory adoption of International Accounting Standards after 2005 by listed companies, our goal is to study the characteristics of companies that are closest to the disclosure requirements of the International Accounting Standards (IAS)¹ related to financial instruments — IAS 32 and IAS 39.

There are several theories that help us develop hypotheses about the determinants of accounting practices: the positive accounting theory (Leftwich, Watts, & Zimmerman, 1981; Watts & Zimmerman, 1978), the signalling theory (Ross, 1977), and legitimacy and institutional theory. These theories have been the background of several accounting studies on determinants of accounting choice and disclosure in a wide range of countries. This paper is based on the idea that those theories, originated in developed capital markets, may not fully explain accounting and disclosure practices in Portugal, where the degree of family ownership is significant and financing policies are bank-oriented. Therefore, we consider variables that capture intrinsic features of Portuguese companies, such as capital structure and characteristics of the corporate governance model, and use these characteristics to rationalize our hypothesis testing results, within other theoretical frameworks, namely, contingency theory and to derive policy implications.

Our main research questions are:

- Do theories on disclosure and accounting choice apply to Portuguese listed companies?
- What are the factors that influence disclosure practices in Portuguese companies?
- What will 2005 really mean for Portuguese companies?

The remainder of the paper is organized as follows. Section 2 presents previous literature related to the determinants of disclosure. Section 3 provides a brief institutional and regulatory background. Section 4 describes the development of the hypotheses. In Section 5 the research design is explained, including a description of the dependent and the independent variables, the sample selection process and its characteristics. Section 6 presents the main statistical results while Section 7 discusses the results and draws some conclusions.

2. Previous literature

Healy and Palepu (2001) describe the theoretical background of the demand for disclosure (agency conflicts and information asymmetry) and review the empirical disclosure literature. They divide the literature into four categories: the role of disclosure regulation in reducing information and agency problems; the effectiveness of auditors and information intermediaries; factors affecting decisions by managers on financial reporting and disclosures; and the economic consequences of disclosures. The most relevant category to our study is the one that tries to explain managers' decisions, which has two main areas: (1) focusing on managers' accounting decisions based on the positive theory of accounting

¹ IAS stands for all the standards issued by IASB including International Financial Reporting Standards (IFRS)

and (2) focusing on management disclosure decisions (voluntary disclosure literature, which is complementary to the first one).

Accounting research on the determinants of disclosure practices and other accounting choices based on company's characteristics is a very extensive field. In this literature review, we concentrate on studies that address IAS adoption or financial instruments accounting.² We divide these studies into two types, based on how the adoption of the standards (dependent variable) is measured. In one group, the dependent variable is a dummy variable that assumes the value 1 if the company claims to adopt IAS, and 0 otherwise. These studies do not take into account the fact that some companies claim to comply with IAS but fail to do so with many IAS requirements (Cairns, 1998, 1999). Consequently, another type of studies that quantify the extent of compliance with a single (or a group of) standard(s) using disclosure indices began to appear. These studies examine annual reports of companies that claim to comply with IAS in order to measure the degree of compliance. This paper belongs to this second group, since we develop a disclosure index based on the requirements of IAS 32 and IAS 39.

The first group includes Tarea (2004), Cuyppers and Buijink (2005), Ashbaugh (2001), Murphy (1999), El-Gazzar, Finn, and Jacob (1999) and Dumontier and Raffournier (1998). The second group includes Chalmers and Godfrey (2004), Glaum and Street (2003), Street and Bryant (2000), Street and Gray (2001), Abd-El salam and Weetman (2003) and Tower, Hancock, and Taplin (1999).

Table 1 summarizes these studies, showing the type of statistical analysis conducted, the explanatory variables adopted and the empirical results.

3. Institutional and regulatory background

In this section we describe the Portuguese companies' institutional environment, namely regarding capital financing and corporate governance systems, highlighting the Portuguese unique features compared to other contexts where determinants of disclosure policies have been studied before. Additionally, we briefly describe the financial instruments accounting rules in Portugal, focusing in the main differences relative to IAS 32 and IAS 39.³

² There are several studies that, in spite of having addressed the determinants of disclosure in general (not specifically related to IAS or financial instruments), bring insights to our research regarding the choice and measurement of explicative and dependent variables: Chen and Jaggi (2000) — Hong Kong, Eng and Mak (2003) — Singapore; Cooke (1989) — Sweden, Cooke (1993) — Japan; Hossain, Tan, and Adams (1994) — Malaysia, Wallace, Naser, and Mora (1994) — Spain, Wallace and Naser (1995) — Hong Kong, Gibbins, Richardson, and Waterhouse (1990), Frost and Pownall (1994), Gray, Meek, and Roberts (1995) — U.S. and U.K., Meek and Roberts (1995) — U.S, U.K. and Continental Europe, Inchausti (1997) — Spain, Raffournier (1995) — Switzerland, Watson, Shrive, and Marston (2002) — U.K., Tai, Au, Yeung, Kwok, and Lau (1990) — Hong Kong, Ahmed and Nicholls (1994), Akhtaruddin (2005) — Bangladesh, Ali, Ahmed, and Henry (2004) — South Asia (India, Pakistan, Bangladesh). Ahmed and Courtis (1999) has an extensive literature review that includes several early accounting studies on the determinants (company's characteristics) of disclosure. It gives a thorough description of each study with respect to sample country, companies and time period, dependent variable(s), independent variables and results.

³ We have followed the 2000 versions of IAS 32 and IAS 39 because these were the versions operating for financial statements in 2001 (the year of our empirical study)

Table 1
Recent empirical studies on the determinants of accounting choices based on firm's characteristics

Type of analysis	Dependent variable		Dummy variable (adopter/non-adopter)									
	Discourse indices											
	Chadwick and Goddrey	Graham and Street	Abd Elsalam and Westman	Street and Gray	Street and Bryant	Tower et al	Culpers and Burmuk	Ashbaugh	Murphy	El-Gazzar et al	Dumontier and Raffournier	Tarca
Corporate variables												
Size	Y	0		0	0	0	0	0	0	0	0	0
Industry	Y	0	Y	Y	0	0	0	0	0	Y	0	0
Auditor type	Y	0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm's status	Y	0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Multinationality		0	0	0	0	0	0	0	0	0	0	0
Profitability		0	0	0	0	0	0	0	0	0	0	0
Relationship shareholders' creations (leverage)	0	0	0	0	0	0	0	0	0	0	0	0
Relationship shareholders' earnings (DI)	0	0	0	0	0	0	0	0	0	0	0	0
Relationship shareholders' managers ownership structure market value)	0	0	0	0	0	0	0	0	0	0	0	0
Capital intensity												
Country of origin				Y	Y	Y	Y	Y	Y	Y	Y	Y
Reputation costs (firm managers affiliation)	Y											
Analysts following												
Length of time to report												

Notes: Y statistically significant relationship, + positive relationship, - negative relationship, 0 no relationship

Portugal is a continental western European country. It is a developed country, member of the euro-area but, in the context of the European Union, to which it belongs since 1986, it is a small and peripheral economy. It is also one of the least developed country in the OECD. Regarding the level of institutional development in the legal, corporate governance and financial systems, Portuguese institutions are less developed than their European Union and East Asia counterparts, more developed than Greek institutions and on a level similar to that of Spanish institutions (Tavares, 2004). Portugal is a bank-oriented country with a universal bank system, strongly concentrated in a few financial groups and with very small influence of foreign banks (Bartholdy & Mateus, 2006). Regarding corporate governance structure, the corporate board structure in Portugal is very different from the U.S.A, but similar to most European countries (Fernandes, 2005; Barrocas, 2003). Companies' boards are mainly organized in a single-tier system, without a separate supervising board (Fernandes, 2005). The single board comprises the CEO, other executive managers and non-executive directors (independent members). The non-executive role is to protect shareholders interests, filling the gap between uninformed shareholders and informed executive managers.

Several studies have examined comparative characteristics of countries regarding financial, legal and corporate governance systems. Though not so many as we would like, some of them include Portugal in their analyses.

Portugal is included in the group of code law countries, specifically in the French family, together with France, Italy, Spain and The Netherlands (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997). The literature (Meek & Thomas, 2004, p. 29) has characterized code law accounting as oriented toward "legal compliance", with low disclosure and an alignment between financial and tax accounting. Banks or governments dominate as a source of finance and financial reporting is aimed at creditor protection. Accounting standard setting tends to be a public sector activity. These characteristics contrast with common law accounting that is oriented toward "fair presentation", transparency and full disclosure, and a separation between financial and tax accounting. Stock markets dominate as a source of finance and financial reporting is aimed at the information needs of outside investors. Accounting standard setting tends to be a private sector activity.

In an alternative classification scheme that has arose in international literature, which divides financial systems into two main groups on the basis of their orientation or the weight of financial intermediation, Portugal is included in the group of bank-oriented systems (Allen & Gale, 2000). In this type of systems, also known as continental system since it is the system of the majority of continental European countries, money flows through financial institutions. This system contrasts with the Anglo-Saxon or market-oriented system in which money is directly channeled through capital markets. Portugal has a very small capital market. According to the World Development Indicators database (World Bank Group), the ratio of stock market capitalization of listed companies to GDP of Portugal in 2000 was 57% compared to 154% and 179% in U.S.A. and the U.K., respectively. It has been shown that the capital structure of companies reflect the differences in financial systems (Rajan & Zingales, 2003), meaning that the financing policies of Portuguese companies are mainly bank-oriented.

Regarding corporate ownership concentration, La Porta, Lopez-de-Silanes, and Shleifer (1999) show that, using the 20% definition of control, there are hardly any widely held

company in Portugal.⁴ On the other side, all firms from the UK, Japan and USA fit the widely held description. Faccio and Lang (2002) reach to much the same conclusion in what concerns to Portuguese companies. In a study of western European companies, they show that there is a sharp separation between ownership patterns in continental Europe and in the UK and Ireland: widely held firms are especially important in the UK and Ireland, while family control is more important in Continental Europe. Portugal shows a percentage of 21% of widely held companies, one of the lowest percentages together with Germany, Austria, and Italy, comparing to 63.08% in UK companies and 62.32% in Irish companies. In contrast, in continental Europe, families are by far the most frequent largest shareholder. The highest percentages of family control are in Portugal, France and Germany. The lowest percentages are in the UK and Ireland. Additionally, regarding the percentage of total market capitalization controlled by the top families in each country, in Portugal the top 15 families control 36.77% of total market capitalization, the highest percentage found in all sample. This number compares to only 6.55% in the UK, and 15.38% in Ireland.

Several research state that countries with better developed capital markets have stronger investor protection (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). Investor protection fosters good corporate governance, which enhances investors confidence. La Porta et al. (2000) show that common law countries have the strongest protection of outside investors whereas French code law countries, where Portugal is included, the weakest protection. Pagano and Volpin (2005) argue that shareholder protection is negatively correlated with proportionality of votes (political factors) and positively correlated with English legal origin. Their empirical results, based on a sample of 21 OECD countries including Portugal, show that continental European countries and Japan, which tend to have proportional voting systems, have weak investor protection and strong employment protection. In contrast, Anglo-Saxon countries, whose political systems tend to be majoritarian, have the reverse. In the study of Defond and Hung (2004), Portugal shows scores for investor protection laws and law enforcement institutions lower than the median scores in the all sample countries, while the UK and the USA have extensive investor protection laws and strong law enforcement institutions, showing higher than the median scores of the respective indexes. A survey on corporate governance in Europe⁵ (Heidrick & Struggles, 2003) ranks Portugal in last place in a composite measure of corporate governance. This study concludes that (p. 28) “Corporate governance practice in Portugal remains far behind accepted European standards... in most cases, local firms continue to have their executive directors participating actively on corporate boards, which are viewed as lacking independence”.

Concluding, Portugal is one of the least developed country in the euro-area and a small OECD country. It has specific features regarding its capital market, companies’ financing structure and corporate governance systems, providing for a different institutional setting from most developed and capital market-oriented countries, such as the UK and USA, where most of the previous disclosure and accounting choice theories have been applied.

⁴ For a description of the historical roots of the Portuguese companies ownership structure, please see Mota (2003).

⁵ This survey includes 10 countries, namely, Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland and the UK.

Concerning the accounting regulatory background for financial instruments, we begin by analysing accounting rules for non-financial companies and then for financial companies. In non-financial companies, on-balance sheet financial instruments should be measured at cost (or market value, if it is lower). Future contracts used in trading operations are measured at fair value. The other off-balance sheet financial instruments are not covered by specific accounting rules. This gap is covered by Portuguese Accounting Directive 18 (CNC, 1996), which establishes compliance with IAS whenever Portuguese standards are not available. So, it may be expected that companies are already adopting some IAS requirements in their accounting for financial instruments.

In financial companies, fair value should be applied to trading securities and to FRAs, futures, options and swaps when used in trading operations. Changes in fair value should be registered in profits and losses in the period in which they occur. For operations that qualify for hedge accounting, profits and losses of the hedging instruments and the hedged instruments are registered simultaneously, and the measurement criterion of the hedged position prevails. Regarding disclosure, the list of requirements is already quite demanding, particularly regarding derivative adoption.

4. Theoretical background and hypotheses development

Given the Portuguese regulatory background presented above, and considering that the European Union has been stating the goal of accounting harmonization since 2000 (through the proposal of Regulation 1606/2002 requiring all listed companies to prepare their consolidated financial statements based on IAS), it is interesting to analyze which companies were already anticipating IAS requirements, especially with respect to financial instruments' disclosure. Since the adoption of IAS means an increase in disclosure requirements, the theoretical background is provided by disclosure theories. Verrecchia (2001) extensively reviews and categorises accounting literature on disclosure in order to develop a theory of disclosure by companies. He concludes that asymmetry reduction is one potential starting point for a comprehensive theory of disclosure.

It has been shown empirically that disclosure is a complex function of several factors: it depends on both company-specific (internal) factors and external factors related to the environmental context of the company, which include, among others, culture, legal system, and institutional background. There are several theories that explain disclosure practices by companies: agency and political costs theories (Watts & Zimmerman, 1978, 1990), signalling theory (Ross, 1977; Morris, 1987), legitimacy and institutional theory (Carpenter & Feroz, 1992, 2001; Guthrie & Parker, 1990; Mezas, 1990), proprietary costs theory (Dye, 1985; Darrough & Stoughton, 1990; Verrecchia, 1983; Wagenhofer, 1990), and contingency theory (Doupnik & Salter, 1995; Fechner & Kilgore, 1994; Gray, 1988).

The argument for this paper is that the agency, the political costs and the signalling theories, widely applied to developed capital markets, may not fully explain accounting and disclosure practices in Portugal, given the specific institutional features of Portuguese companies (high degree of family ownership, few independent board members, and bank-oriented financing policies).

Nobes (1998) describes a model of international differences in financial reporting based on the different purposes of reporting in each country, which are determined by the financial system. Disclosure items are determined by the relative importance of outsiders (financiers who do not belong to the board of directors, including individual shareholders) compared with insiders (financiers such as governments, families and banks). In countries where outsiders are important, there is a demand for more disclosure. Models that incorporate cultural and other environmental factors have been empirically tested by several researchers in either multi-country studies (Archambault & Archambault, 2003; Hussein, 1996; Jaggi & Low, 2000; Salter, 1998; Williams, 2004; Zarzeski, 1996) or single-country studies (Akhtaruddin, 2005; Chen & Jaggi, 2000; Haniffa & Cooke, 2002). Chen and Jaggi (2000) study the influence of specific corporate governance factors present in East Asian companies (proportion of independent directors in the corporate board and family ownership) on disclosure. Haniffa and Cooke (2002) include corporate governance, cultural and company-specific factors as determinants of disclosure, arguing that (p. 317) “disclosure practice does not develop in a vacuum, but rather reflects the underlying environmental influences that affect managers and companies in different countries”.

4.1. The hypotheses and the independent variables

Based on the theoretical considerations and on the empirical research previously described, we have developed several hypotheses that relate company-specific characteristics to disclosure practices in Portugal. All hypotheses are stated in alternative form, indicating the expected sign of the relationship.

4.1.1. Size

There are several arguments that can be used to link size to disclosure. As Watts and Zimmerman (1990) argue, political costs are higher in larger companies, and so larger companies are more likely to show higher levels of disclosure since it improves confidence and reduces political costs. Also, larger companies are supposed to have superior information systems, so additional disclosure is supposedly less costly in larger companies than in smaller ones. Moreover, proprietary costs related to competitive disadvantages of additional disclosure (Verrecchia, 1983) are smaller as company size increases.

H1. Larger companies are expected to have higher levels of disclosure than smaller companies.

4.1.2. Industry

The relationship between industry and disclosure can be explained by the political costs theory. Watts and Zimmerman (1990) argue that industry membership (being related to size) is related to political costs. Proprietary costs also vary according to industry.

Additionally, companies in the same industry are interested in having the same level of disclosure in order to avoid negative appreciation by the market (competitive pressures). This argument is in line with signalling theory.

Legitimacy and institutional theory also support this hypothesis, because some industries have higher institutional pressures than others.

These theoretical considerations do not clearly define the direction of the relationship between disclosure and industry. Therefore, our hypothesis does not indicate an expected sign for the relationship.

H2. Disclosure practices are predicted to be related to the industry in which the company operates.

4.1.3. Auditor type

Chalmers and Godfrey (2004) argue that, to maintain their reputation and avoid reputation costs, high profile auditing companies are more likely to demand high levels of disclosure. Dumontier and Raffournier (1998) observe that, in their own interest and for the sake of their reputation, auditors want their clients to comply with complex accounting standards.

This is also linked to the fact that major international auditing companies have greater knowledge about IAS, and so the costs of implementing and auditing them in their clients is lower than for smaller auditing companies.

Auditing is argued to be a way of reducing agency costs (Jensen & Meckling, 1976; Watts & Zimmerman, 1983), and so companies that have high agency costs tend to contract high quality auditing companies.

H3. The degree of disclosure is predicted to be higher in companies audited by the Big 5 auditors than in companies with non-Big 5 auditors.

4.1.4. Listing status

The relationship between the company listing status and disclosure practices is based on agency cost and the signalling arguments. Companies listed on multiple or foreign stock exchanges have greater agency problems. Higher disclosure reduces shareholders' monitoring costs. Additionally, foreign investors are unfamiliar with national standards, and so internationally listed companies tend to comply with international standards so that their accounts are understood by potential investors.⁶

Companies expect that compliance with IAS and high disclosure levels are interpreted as good signals by the market, therefore being a means of obtaining cheaper capital. This argument is even stronger if the company wants to raise its capital in foreign markets (capital-need hypothesis, Cooke, 1989).

H4. The degree of disclosure is predicted to be higher in companies listed on foreign exchanges than in companies listed on only one (the national) stock exchange.

4.1.5. Multinationality

This hypothesis is linked to the previous one. The more internationalised a company is the more it has to show its stakeholders (customers, suppliers, government) that it is a good company. Even a company that is not internationally listed may have an interest in showing good levels of disclosure if it has international operations.

⁶ Many stock exchanges around the world allow foreign companies to prepare their financial statements according to IAS (see IASB site).

Cooke (1989) also argues that companies operating in more than one geographical area tend to have better managerial control systems because of the greater complexity of their operations. Better and more sophisticated management control and reporting systems produce information that can be easily disclosed without additional costs. So, they are expected to have higher levels of disclosure.

H5. The degree of disclosure is predicted to increase with the internationalisation degree of the company.

4.1.6. Capital structure

4.1.6.1. Shareholder creditor relationship. As higher leverage levels suggest higher agency costs (potential wealth transfers from debtholders to shareholders and managers), compliance with IAS and good disclosure levels can be used to reduce agency costs and information asymmetries. There are authors, however, that support a negative relation between leverage and disclosure (Abd-Elsalam & Weetman, 2003; Zarzeski, 1996). The argument is based on signalling factors and relies on the fact that companies with high leverage ratios belong to bank-oriented financial systems where capital markets are not seen as a primary source of capital, and information about companies is more private. This argument, however, does not take into account public debt. These arguments show the inability of leverage alone to be a good proxy for the capital structure of a company in terms of its relation to disclosure degree, because debt may be inside or outside debt. Tarca, Moy, and Morris (2005), based on Nobes (1998), argue that companies with relatively more outside debt are more likely to use IAS. They define outside debt as the amount of long term debt that is sourced from the public capital market. Based on theoretical considerations and on previous empirical studies, we argue that the degree of disclosure is related to leverage, without specifying a direction for the relationship.

H6. The degree of disclosure is predicted to be related to leverage.

4.1.6.2. Importance of shareholders The greater the importance of equity the greater the information shareholders need and the monitoring costs. The argument is the same as the one for the agency costs reduction. However, the same problem regarding outside versus inside equity exists. Equity may be inside, in which case shareholders have access to inside information, meaning that disclosure is less important. Tarca et al. (2005) define outside equity as the proportion of equity held by outsiders, based on information about shareholder structure. Based on the theoretical considerations and on previous empirical studies we argue that:

H7. The degree of disclosure is predicted to be higher the more the company relies on equity markets.

4.1.7. Corporate governance

Both agency and contingency theories lead us to think that the corporate governance structure of the company may be related to reporting practices, specifically to disclosure

practices. The premise of agency theory is that independent directors are needed on the boards to monitor and control the actions of the other executive managers (Haniffa & Cooke, 2002). So, board composition may be an interesting variable to consider because it will reflect the role of independent directors. More disclosure can be expected from companies with a higher proportion of independent directors. On the other hand, if the board has a high proportion of non-independent directors, less disclosure can be expected since they have access to inside information. Portuguese companies, as shown in Section 3, are family managed, and have scarce separation between ownership and management. As such, if the board includes representatives of shareholders, they do not have to rely extensively on public disclosure since they have access to internal information.

H8. The degree of disclosure is predicted to be higher the greater the proportion of independent directors on the board.

5. Research design

This study has three main research questions:

- Do theories on disclosure and accounting choice apply to Portuguese listed companies? Which are the most important factors that influence disclosure practices by Portuguese companies?
- What will 2005 really mean for Portuguese companies?

Based on these broad questions, our immediate research goals are:

- to identify the most important factors associated with the level of financial instruments disclosure and,
- to identify the characteristics of the companies that are closest to IAS 32 and IAS 39 requirements.

Next we describe how we constructed a disclosure index to measure the dependent variable, the proxies for the independent variables, the sample collecting process and the sample's main characteristics.

5.1. The dependent variable

With the objective of identifying disclosure practices concerning financial instruments we applied the content analysis technique to listed companies' annual reports, which were comprehensively analyzed. This analysis is based on a list of categories, covering all the items that allow us to identify the existence of disclosures required by IAS 32 and IAS 39.

Based on that list of categories a disclosure index was constructed. This index has the following eleven main categories of information, which are then subdivided into 54 items:

- (1) Accounting policies (7 items)
- (2) Fair values and market values (9 items)

- (3) Securitisation and repurchase agreements (5 items)
- (4) Derivatives: Accounting policies (5 items)
- (5) Derivatives: Risks (4 items)
- (6) Derivatives: Hedging (10 items)
- (7) Derivatives: Fair value (4 items)
- (8) Interest rate risk (2 items)
- (9) Credit risk (3 items)
- (10) Collateral (2 items)
- (11) Other (3 items)

The detailed components of this index are described in Appendix A.

The index was constructed according to the literature on related areas, and has three main characteristics: it is (1) dichotomous, (2) unweighted, and (3) adjusted for non-applicable items.

5.1.1. Dichotomous

A score of 1 is assigned to an item if it is disclosed (disclosure index), and a score of 0 otherwise.

The total score for a company is:

$$T = \sum_{i=1}^m d_i$$

where d_i is 1 if item i is disclosed, and 0 otherwise; m is the maximum number of items ($m=54$).

5.1.2. Unweighted

The total score is computed as the unweighted sum of the scores of each item. The implied assumption is that each item is equally important for all user groups. This assumption may not be realistic, but we think that the resulting bias is smaller than the one that would result from assigning subjective weights to the items. The majority of disclosure studies use unweighted indices: Cooke (1989), Cooke (1993), Meek and Roberts (1995), Raffournier (1995), Inchausti (1997) and Chalmers and Godfrey (2004). Some of the disclosure literature supports unweighted indices. Robbins and Austin (1986) found that (p. 412–413) “the independent variables, which were significantly associated with the simple index of disclosure (consists only of the extent of disclosure) quality, were also significantly associated with the compound index (the product of the extent and relative importance of financial disclosure index)”. Spero (1979), as cited by Hodgdon (2004), argues that attaching weights to disclosure items is irrelevant because companies that tend to be more forthcoming with less important information also tend to be more forthcoming with more important information. Firth (1980) and Adhikari and Iondkar (1992) found the same results for weighted and unweighted indices.

5.1.3. Adjusted for non-applicable items

The applicability of any item to each company was taken into account, that is, we considered that a company should not be penalized if an item were not relevant. We read the entire annual report, and if a specific item is not mentioned we assume that it is not relevant. So the maximum score for each company is computed as follows:

$$M = \sum_{i=1}^n d_i$$

where d_i is the disclosure item, and n is the number of items applicable to that company ($n \leq 54$).

Then an adjusted index is calculated as TM . This adjustment procedure for non-applicable items is found in most of the empirical studies reviewed (Cooke, 1989, 1993; Inchausti, 1997; Meek & Roberts, 1995; Raffournier, 1995).

5.2. The independent variables

According to our hypotheses, the determinants of disclosure to be tested are size, industry, auditor type, listing status, multinationality, capital structure and corporate governance characteristics.

Although size can be measured in several different ways, we consider the following: total assets ($Tassets$) and total sales ($Tsales$), measured in million euros. These measures of size are used in many studies.

From prior research and theoretical considerations, there is no consistent approach to classify companies by industry. We adopt the classification of financial and non-financial companies using a dummy variable ($ind1$).

Auditor type is a dummy variable that takes the value 1 if the company is audited by a Big 5, and 0 otherwise. In 2001, the Big 5 auditors were Arthur Andersen, PricewaterhouseCoopers, Deloitte Touche Tohmatsu, Ernst and Young and KPMG.

Listing status is another dummy variable that takes the value 1 if the company is listed in the stock exchange of the country of origin, and 0 otherwise. That is, for a company that is listed or cross-listed in foreign stock exchanges this variable takes the value 0.

The degree of multinationality is measured by the percentage of foreign sales (foreign sales divided by total sales).

Regarding capital structure, we identified three relevant variables: leverage, importance of equity, and ownership diffusion. The degree of leverage is measured by the debt to equity ratio. It would be important to distinguish between inside and outside debt (Tarca et al.,

We are aware of the subjectivity that can be introduced by this procedure. Regarding the type of instruments and transactions, which are quite new and unknown for some of the sample companies, we believe that by not adjusting for non-applicable items we would introduce a significant bias. This situation is the opposite of what we find in Chalmers and Godfrey (2004), where companies not using derivatives and making no disclosure were considered as non-disclosing companies. The reason is that it is assumed that the majority of companies would be using derivative instruments based on a previous survey.

2005) since agency theory predicts more disclosure in case of public debt. Unfortunately, we were unable to distinguish between public and private debt based on the information disclosed by companies, meaning that if this distinction were considered, many observations from an already small number of companies would have to be excluded.

The importance of equity is measured by the ratio market value to total assets. Equity investors are usually outsiders to a company. But this is not always true, especially in Portugal where companies, even public companies, are family owned and capital is concentrated in a small number of shareholders. If a shareholder owns a large stake in a company, the dependence on public disclosure is likely to be smaller, because he can directly monitor management. Therefore, it is interesting to analyse stock ownership. Article 448° of Commercial Law (Código das Sociedades Comerciais) obliges companies to disclose the name of the shareholders that hold more than 1/10, 1/3 and 1/2 of the capital. Article 6° of Regulation no. 11/2000 (CMVM, 2000), revised by Regulation no. 4/2004 (CMVM, 2004), of the Portuguese Securities Market Regulator (CMVM – Comissão do Mercado de Valores Mobiliários) obliges the disclosure of qualified holdings (5%, 10% or 20% of the capital as set forth in the Portuguese Securities Code). This means that even if companies disclosed the information required by law, it would not be possible to construct a coherent variable for every company (such as the proportion of shares owned by the five largest shareholders or the percentage of shares held by institutional shareholders) because companies only disclose some of their shareholders.⁸ In order to include this variable in the econometric analysis, several observations would have to be deleted, and so, we decided not to include it. Instead, the information obtained is used to explain and rationalize results obtained in the hypothesis testing. A descriptive analysis of the ownership diffusion of Portuguese companies based on the publicly available data is presented on the section of the sample description below.

For the purpose of including the characteristics of corporate governance structure as a determinant of disclosure, and driven by agency and contingency theories, we defined a variable for the proportion of independent directors on the board.

In Portugal, the regulation of corporate governance practices and disclosure is under the responsibility of the Portuguese Securities Market Regulator (CMVM). In 1999, CMVM approved the first “Recommendations on Corporate Governance”, which included a set of non-mandatory rules that should be complied with by companies. According to Recommendation no. 15 (CMVM, 1999) “the board of directors should be comprised in such a way as to ensure that the management of the company is not only geared towards the protection of the interests of the majority of stakeholders. It is therefore recommended that independent members exercise significant influence on collective decision-making and that they contribute to the development of the strategies of the company, thereby acting in the interests of the company as a whole”. This Recommendation, however, did not produce fair disclosures for investors. This was recognized by CMVM itself, which published a first mandatory set of rules – Regulation no. 7/2001 (CMVM, 2001a). In this Regulation, CMVM recognizes that the disclosure of the extent to which the Recommendations on

⁸ We tried to overcome this problem by asking the Portuguese stock exchange (Euronext Lisbon) for this information, which sent us a database for the year 2000 (the latest year for which it was available). We could have used the information for the year 2000, but this database revealed to be very incomplete and did not have the five biggest shareholders for all quoted companies.

Corporate Governance were observed is being complied increasingly by companies, but "... it is not unusual to find that disclosure is uneven and insufficient". Regulation no. 07/2001 obliges listed companies to disclose annual information on various aspects of corporate governance in an appendix or chapter of their annual report. This is the reason why the construction of our variable of percentage of independent directors is based on the corporate governance reports (or chapters of annual reports) of the year 2002. The variable obtained is not exempt from limitations. Indeed, independence is a concept defined by each company. This means that we register what companies disclose in their reports as independent directors in the board, since there is not a definition of independence imposed by law and applied to every company.⁹

Besides the proportion of independent directors in the board, we define two alternative measures for corporate governance characteristics of Portuguese companies. A first measure is a dummy variable that takes the value of 1 if the company complies with Recommendation 9 (CMVM, 2001b), and zero otherwise. This recommendation encourages the inclusion of one or more independent directors (regarding major shareholders) in the board and a clear definition of independence by the company. The other proxy is the percentage of compliance with all the CMVM's "Recommendations on Corporate Governance" (CMVM, 2001b). These two measures are based on the answers, by listed companies, to the 4th survey on the practices regarding corporate governance (CMVM, 2002).

Table 2 sums up the hypotheses, the proxies for measuring the independent variables and the predicted relationships with the dependent variable.

5.3. *Sample selection and characteristics*

All listed companies at Euronext Lisbon on 31st December 2001 were selected for this study. At the end of 2001, there were 56 quoted companies in Portugal, listed in Appendix B. One company (PT Multimédia.com) did not publish the annual report and financial statements in 2001 and was excluded from the analysis. Hence, the final sample includes 55 companies, with 29% from the industrial sector and 20% from the financial sector (Table 3).

⁹ CMVM felt, afterwards, the need for defining a clear and objective concept for independent director and in its Regulation no. 11/2003 (CMVM, 2003), article 1, it states that "administrators associated with specific interest groups in the company shall not be considered independent officers, namely:

- a) Members of the board of directors who are also members of the board of directors of the controlling company, as set forth in the Portuguese Securities Code;
- b) Members of the board of directors who are holders of qualified holdings in an amount equal to or larger than 10% of the share capital or of the voting rights in the company, or an identical percentage in a controlling company, as set forth in the Portuguese Securities Code;
- c) Members of the board of directors who hold management position or have contractual ties with a competing company;
- d) Members of the board of directors who receive compensation from the company, or from any parent company or affiliates within the same group other than in the form of compensation for their role as corporate officers;
- e) Members of the board of directors who are spouses, family or direct kin through third lineage, including those persons referred to in the paragraphs above.

In addition to checking the circumstances described above, the board must ensure, in a well founded manner, the independence of the directors in light of other pertinent circumstances."

Table 2

Hypotheses, variables' proxies and expected relationship

Hypothesis	Variables proxies		Expected relationship
Size	Total assets	Tassets	Positive association with the disclosure degree
	Natural log of total assets	Lassets	Positive association with the disclosure degree
	Total sales	Tsales	Positive association with the disclosure degree
	Natural log of total sales	Lsales	Positive association with the disclosure degree
Industry	1 dummy variable	ind1: Financial (1=yes; 0=no)	No prediction
Auditor type	1 dummy variable	d_aud: Big 5/Non Big 5 (1=yes; 0=no)	Positive association with the disclosure degree
Listing status	1 dummy variable	d_list: Country of origin/ Foreign country (listed on one foreign stock exchange or multilisting) (1=yes; 0=no)	Negative association with the disclosure degree
Multinationality	Sales foreign countries/ Total sales	Mult	Positive association with the disclosure degree
<i>Capital (finance) structure</i>			
Shareholders/creditors	Debt/Equity	DE	No prediction
Ownership diffusion (not included in model for econometric analysis)	Percentage of shares owned by the top five shareholders	Own_conc	Negative association with the disclosure degree
Shareholders	Market value/ Total assets	MV	Positive association with the disclosure degree
<i>Corporate governance</i>			
Board composition	Proportion of independent directors	Ind_dir	Positive association with the disclosure degree
Compliance with CMVM recommendation regarding independent directors	1 Dummy variable	D_ind_dir: 1=complies; 0=does not comply	Positive association with the disclosure degree
Compliance with all CMVM corporate governance recommendations	Degree of compliance (in percentage)	Corp_gov	Positive association with the disclosure degree

Most companies (90%) are quoted in the Portuguese stock exchange only. Additionally, there are five companies that are cross-listed in the USA. Regarding the auditor company, the majority (76%) is audited by a Big 5 company. This information was obtained from the companies' annual reports and websites (Table 4).

Regarding capital structure, we analyze companies' debt to equity ratio, market capitalization to total assets ratio and ownership diffusion. The source for the first two variables is the annual reports, and for the ownership diffusion variable is a database provided by Euronext Lisbon (CD-ROM of quoted companies for the year 2000) (Table 5).

Table 3
Sample sectoral distribution

Economic sector	N	
Basic materials	7	12.7%
Consumer, cyclical	9	16.4%
Consumer, non-cyclical	4	7.3%
Financial	11	20.0%
Industrial	16	29.1%
Technology	4	7.3%
Telecommunications	3	5.5%
Utilities	1	1.8%
Total	55	100.0%

Regarding corporate governance variables, we computed the percentage of independent directors in the board of directors, based on the 2002 reports published by companies.¹⁰

Analysing the proportion of independent directors (Table 6, panel A), we conclude that in almost 50% of companies less than half of the directors are independent. Almost 30% of companies claim to have between 90 to 100% of independent directors in their Board. As previously mentioned, in 2002 the definition of independence was not set forth by any regulation; each company defined what it considered to be independent directors and the disclosure was based on this self-constructed concept of independence. This means that it may have happened that some directors, considered independent, were not independent in the light of the subsequent regulations on corporate governance.¹¹ Consequently, the results for this variable must be interpreted with caution.

In order to mitigate the disadvantages of the previous measure, two additional measures based on alternative sources of information are considered. The first is a dummy variable that takes the value 1 if the company complies with CMVM's recommendation regarding the existence of at least one independent director and the existence of a definition of independence, and 0 otherwise. The source for this variable is CMVM and data for the variable are obtained through a survey to quoted companies. The second is a continuous variable that measures the degree of compliance with the overall recommendations on corporate governance, as published in the 4th survey on corporate governance practices (CMVM, 2002).

Analysing compliance with Recommendations on Corporate governance, we conclude that Portuguese companies still have a long way to go regarding good practices on corporate governance. Most companies (53%) do not comply with the recommendation related to independent directors (Table 6, panel B), which includes both the need of having at least one independent director on the Board and the existence of a definition of independence.

¹⁰ When companies did not disclose this information, all directors were classified as non-independent. This procedure may create a bias but it is considered preferable to the alternative procedure of eliminating the observations.

¹¹ Indeed, the 4th Survey of the Corporate Governance Practices (CMVM, 2002), par 3.9, states that "this recommendation (the existence of one or more independent directors) is the one with lower degree of compliance – this is due, mainly, to the fact that it has been introduced an additional question associated with this recommendation – the existence of a clear definition of independence in the company. In fact, if this question were not included, 80.4% of the companies would comply with this recommendation." (authors' translation) As a consequence, CMVM subsequently decided to include definitions of independence and specifically defined who cannot be considered an independent director (Regulation no. 11/2003 (CMVM, 2003) and Regulation no. 10/2005 (CMVM, 2005)).

Table 4

Sample descriptive statistics

	N	Minimum	Maximum	Mean	S.D.
Total assets	55	22.05	358,137.51	10,833.29	48,944.85
Total sales	55	5.80	34,885.49	1720.26	4890.21
Sales foreign countries/total sales	55	.00	93.46	24.55	29.64
Total liabilities	55	37.91	96.33	72.55	15.06
Debt/equity	55	.61	26.28	4.93	5.51
Market value/total assets	55	3.36	219.49	37.12	39.95
				N	%
<i>Listing status</i>					
				50	90.91
Listed, origin country stock exchange				0	0.00
Listed, (one) foreign stock exchange				5	9.09
Multilisting, including USA				0	0.00
Multilisting, not-including USA					
<i>Auditor status</i>					
				42	76.36
Big five				13	23.64
Not Big five					

The average degree of compliance with all recommendations (Table 6, panel C) is slightly above 50%, meaning that, on average, almost half of the recommendations are not complied with by Portuguese companies. No single company complies with all the recommendations (the maximum value for the compliance degree is 92%).

6. Results

6.1. Descriptive statistics

Table 7 reports the overall means and standard deviations for the dependent variable – the adjusted disclosure index (*Idisc_a*) – and for each of its categories. The range of scores for the disclosure index varies from 16% to 64% with a mean of 44%. The category with the largest disclosure degree is “Accounting policies”. The disclosure degree within this category, which comprises the disclosure of the accounting policies for each class of financial instruments, shows a mean of 80% among all companies. On the other hand, the categories that show lowest levels of disclosure are “Fair and market values” and “Credit risk”. The first includes the disclosure of measurement method and

Table 5

Ownership diffusion (percentage of shares held by top shareholders)

Shareholders	Number of disclosing companies	Average (%)	Max (%)	Min (%)	S.D.
Top five	27	59.33	95.65	18.09	0.220484
Top four	7	64.98	96.68	25.89	0.213024
Top three	6	75.41	91.90	55.91	0.124249
Top two	10	70.82	99.20	42.94	0.167491

Table 6

Corporate governance

Panel A: Proportion of independent directors on the board

Proportion of independent directors	Number of companies	Percentage (%)	Accumulated distribution (%)
≥ 90 e ≤ 100	15	27.27	100.00
80 e 90	1	1.82	72.73
70 e 80	1	1.82	70.91
60 e 70	6	10.91	69.09
50 e 60	4	7.27	58.18
40 e 50	4	7.27	50.91
≥ 30 e < 40	3	5.45	43.64
≥ 20 e < 30	4	7.27	38.18
≥ 10 e < 20	4	7.27	30.91
$< 10\%$	13	23.64	23.64
	55	100	

Panel B: Degree of compliance with the CMVM's Recommendations regarding independent directors

	Number of companies
Yes	22 (46.81%)
No	25 (53.19%)
Total	47

Source: Data granted by CMVM

Panel C: Degree of compliance with the CMVM's Recommendations on Corporate Governance

	Degree of compliance
Max	92.30%
Min	18.20%
Average	57.13%
S.D.	18.40%
Total obs	47

Source: CMVM (2002)

significant assumptions. The average disclosure degree within this category is only about 5%. The category for credit risk comprises the disclosure of the main counterparties, maximum amount of credit risk exposure and significant concentration of credit risk. This category shows an average disclosure degree of 6%.

Table 8 shows the mean of the index of disclosure by economic sector, by type of auditor and by listing status. Companies from the technological sector show the highest level of disclosure and, as expected, cross-listed companies and companies audited the Big 5 show higher average levels of disclosure.

6.2. Simple regressions

OLS simple regressions were estimated to check for univariate relationships between the disclosure index and each variable. The results obtained are shown in Table 9: for each explanatory variable, regression coefficients and *t*-statistics are reported. When there is a hypothesized direction for a variable, a one-tailed *t*-test is used, otherwise two-tailed tests

Table 7

Dependent variable

	Minimum	Maximum	Mean	S.D.
Disclosure index	0.16	0.641	0.44	0.09
Categories				
(1) Accounting policies	.000	1.000	.804	.120
(2) Fair values and market values	.000	.500	.054	.129
(3) Securitisation	.400	.800	.600	.126
(4) Derivatives — Accounting policies	.000	1.000	.590	.334
(5) Derivatives — Risks	.000	1.000	.535	.323
(6) Derivatives — Hedging	.000	1.000	.401	.250
(7) Derivatives — Fair value	.000	.500	.171	.221
(8) Interest rate risk	.000	1.000	.345	.270
(9) Credit risk	.000	1.000	.067	.207
(10) Collateral	.000	1.000	.491	.402
(11) Other	.000	1.000	.494	.101

are used. In every regression, we analyze the presence of heteroscedasticity with White's general test (White, 1980). When this test indicated the presence of heteroscedasticity, the White's heteroscedasticity consistent variances and standard errors were used.

Three hypotheses are statistically validated. The first is H1 which relates the company size to disclosure level. All measures of size are statistically significant and the sign of the coefficient is positive, as predicted. There is also a significant relationship between being audited by a Big 5 company and the level of disclosure, confirming H3. Being listed in more than one stock exchange (cross-listing) influences the level of disclosure as predicted by H4. Companies that are listed only in the Portuguese exchange disclose less than companies with multilisting status. Being a financial or a non-financial company is not related to the level of disclosure. Neither the degree of multinationality nor any of the

Table 8

Dependent variable means by economic sector, auditor type and listing status

	Disclosure index	
	Mean	S.D.
<i>Economic sector</i>		
Basic materials	.435	.038
Consumer, cyclical	.422	.071
Consumer, non-cyclical	.465	.101
Financial	.446	.156
Industrial	.440	.081
Technology	0.471	0.48
Telecommunications	.394	.071
<i>Auditor type</i>		
Non-big five auditor	.399	.085
Big five auditor	.451	.091
<i>Listing status</i>		
One or more foreign stock exchange	.537	.056
Portuguese stock exchange	.429	.089

Table 9

OLS simple regressions (White Heteroskedasticity-Consistent Standard Errors and Covariance, when necessary)

Hypothesis	Variable	Coefficient	t-Statistic
1	Tassets	4.61E-07	4.100543*
	Lassets	0.012256	1.731635**
	Tsales	5.09E-06	2.050536**
	Lsales	0.015320	2.288001**
2	IndI	0.008909	0.285146
3	D_aud	0.052654	1.845112**
4	D_list	-0.107740	-2.633464*
5	Mult	0.000274	0.647
6	Thab	0.000648	0.777255
	Fhab	1.093E-04	0.157
	DE	0.003690	1.010319
	MV	-0.00196	-0.622468
8	Ind_dir	0.023527	0.724669
	D_ind_dir ^a	0.036396	1.316085
	Corp_gov ^a	0.082069	1.51533

Note: White Heteroskedasticity-Consistent Standard Errors and Covariance, when necessary. * significant at 10%, ** significant at 5%; *** significant at 10%. One-tailed tests.

^a These equations are estimated with the number of observations available for these variables (47 observations)

variables related to capital structure prove to be related to disclosure. Moreover, the variables used for the corporate governance structure, individually considered, do not show a statistically significant relationship with disclosure.

6.3. Multiple regressions

In multiple analysis, which jointly tests the previously formulated hypotheses, all independent variables are considered in the models. The different measures for size are highly correlated (the correlations between variables are shown in Appendix C), which means that they cannot be all included in the model. In order to circumvent this problem, we used the same procedure as Cooke (1989): we run a regression for each measure of size (total assets, total sales, the natural logarithm of assets and the natural logarithm of sales).¹² Regarding corporate governance variables, we started by including the proportion of independent directors. Then, an alternative measure using a dummy variable was substituted for the proportion of independent directors. Finally, we tested another alternative measure for corporate governance: the degree of compliance with all CMVM's recommendations.

Some literature on determinants of disclosure indices points out a non-linear relationship between the dependent and the independent variables (Parviainen, Schadewitz, & Blevins, 2001; Cooke, 1998). In previous empirical studies, researchers have often used transformations in order to allow for non-linear relationships (Abd-Elsalam & Weetman, 2003; Ali, Ahmed, & Henry, 2004; Haniffa & Cooke, 2002; Hodgdon, 2004; Lang &

¹² In related literature, we found other alternative procedures such as select the most relevant measure based on their explanatory power in univariate analysis (Dumontier & Raffournier, 1998) or in a pre-run stepwise regression (Giner, 1997; Raffournier, 1995; Street & Bryant, 2000) or, still, create a composite variable using factor analysis (Dumontier & Raffournier, 1998).

Table 10
Regression results

(Dependent variable: <i>idisc_a</i>)			
Independent variable	Model 1	Model 2	Model 3
	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)
Tassets	2.24E-07 (1.601922)***	2.98E-07 (1.964425)**	3.27E-07 (2.202875)**
Ind1	-0.094637 (-1.452701)	-0.138512 (-1.700795)++	-0.135906 (-1.654129)++
D_aud	0.041394 (1.165508)	0.054789 (1.446672)***	0.067667 (1.549685)***
D_list	-0.085970 (-2.126436)**	-0.082827 (-2.083458)**	-0.099605 (-2.135163)**
Mult	-7.80E-05 (-0.194589)	-0.000305 (-0.753093)	-0.000308 (-0.717547)
DE	0.006236 (1.115077)	0.008090 (1.432250)	0.008260 (1.402708)
MV	-0.000184 (-0.394449)	-0.000273 (-0.547384)	-0.000295 (-0.561823)
Ind_dir	-0.004799 (-0.168400)		
D_ind_dir		0.013069 (0.469624)	
Corp_gov			-0.069853 (-0.830426)
Included obs	55	47	47
Adj <i>R</i> ²	0.10537	0.126359	0.135941

Note: White heteroskedasticity-consistent standard errors and covariance, significant at 1%, ** significant at 5%, *** significant at 10%. One-tailed tests, ++ significant at 10%. Two-tailed tests.

Lundholm, 1993; Wallace, Naser, & Mora, 1994). According to this past evidence the logarithmic transformation is commonly applied to address alternative functional forms between the dependent and the independent variables. We performed the logarithmic transformation of the dependent variable (*log lin*) and estimated these alternative models. Also, quadratic terms of some independent variables were included in the regressions to test for alternative functional form specifications and to capture decreasing or increasing marginal effects (Hodgdon, 2004). These models (not reported) did not show any improvements when compared with linear results: lower *R*²s were obtained and the models showed problems in their overall significance (*F*-statistic).

The estimation results for the linear models with total assets as a proxy for size are reported in Table 10.¹³ Four independent variables proved to be statistically significant: total assets, economic sector, auditor type and listing status.

H1, which states that size is positively related with disclosure, is supported by the results. This finding is consistent with Chalmers and Godfrey (2004), who also find a statistically positive relationship between size and financial instruments' disclosure. However, this result is inconsistent with studies that analyze compliance with disclosure requirements of several IAS at the same time, which found no significance for company size (Glaum & Street, 2003; Hodgdon, 2004; Street & Bryant, 2000; Street & Gray, 2001; Tower et al., 1999).

H2, which states that disclosure is related to the type of industry, is also supported by the results, which show that belonging to the financial sector is negatively related to the disclosure level. This is consistent with the study of Karim and Ahmed (2005), which also tests the effect of financial non-financial sector on disclosure compliance with IAS. Other

¹³ After an analysis of the alternative models adequacy, based on broad features of the estimation results, such as the *R*² value, the estimated *t* ratios and the signs of the estimated coefficients in relation to their prior expectations, models with Tassets (reported in Table 10) show better results than the others (not reported).

studies do not follow this classification. Chalmers and Godfrey (2004) separate mining and oil companies from the others. Several studies separate manufacturing from non-manufacturing industries (Abd-Elsalam & Weetman, 2003; Street & Bryant, 2000), and others use more than two industry classes.

H3, which states that disclosure degree is higher for companies audited by a Big 5 is also supported. This finding is consistent with Hodgdon (2004), Glaum and Street (2003) and Street and Gray (2001), who find positive significant relationship between IAS compliance and type of auditor. Chalmers and Godfrey (2004) and Abd-Elsalam and Weetman (2003) find mixed results regarding this variable.

The coefficient of listing status is statistically significant in all models, providing support for H4, which states that the degree of disclosure is higher in companies listed on foreign exchanges than in companies listed on only one (the national) stock exchange. This finding is widely evidenced in the literature on compliance with disclosure requirements of IAS, namely in Hodgdon (2004), Glaum and Street (2003), Abd-Elsalam and Weetman (2003), Street and Gray (2001) and Street and Bryant (2000).

H5, which states that the degree of disclosure is higher in more internationalized companies, is not supported by our models. This finding is consistent with Street and Gray (2001), who find that the degree of multinationality is not a significant determinant of the extent of compliance with IAS required disclosures.

The results do not show any significant influence of capital structure on disclosure. H6 (degree of leverage, measured by the debt to equity ratio) is not supported. Previous studies on compliance with IAS do not find statistically significant relationships either, except for the study of Abd-Elsalam and Weetman (2003) who find, in some cases, a significant and negative relationship. Regarding equity financing, the importance of shareholders, measured by the ratio of market capitalization to total assets, does not prove to be a significant determinant of disclosure, either. Abd-Elsalam and Weetman (2003) find mixed results for this factor: no significance for non-familiar IAS and significance for familiar IAS.

In spite of what was expected, our data do not show evidence on the influence of corporate governance on disclosure by Portuguese companies. Neither the proportion of independent directors nor the degree of compliance with the overall corporate governance recommendations of CMVM prove to be related to disclosure. The other alternative measure for the importance of independent directors obtained from the survey conducted by CMVM does not show any improvements in the results, either.

In summary, our results support H1, H2, H3, H4,, that is we find that size, belonging to the financial sector, auditor type and listing status determine the degree of financial instruments disclosure. The results do not support the influence of the internationality degree (H5), of the capital structure (H6 and H7), and of the corporate governance structure (H8) on disclosure.

7. Discussion and conclusions

The Portuguese Accounting Directive 18 (CNC, 1996) establishes compliance with IAS whenever Portuguese standards are not available. There is a lack of accounting standards for financial instruments in Portugal, namely regarding derivatives. Consequently, it may be expected that companies have been adopting IAS requirements in their accounting for financial instruments. Bearing the mandatory adoption of IAS after 2005 in mind, it is interesting to

analyze the characteristics of the companies that were already anticipating IAS requirements, especially with respect to financial instruments' disclosure items before 2005. In order to achieve this objective, we construct an index of disclosure issues that comprises 54 items relating to financial instruments. The components of the index are based on IAS 32 and IAS 39.

Besides the factors derived from the agency, the political costs and the signalling theories, we introduce the analysis of capital finance structure and corporate governance features in the context of contingency theory. Portuguese companies typically have a high degree of family ownership and bank-oriented financing policies. Additionally, corporate governance practices have not been regulated until recently (in 2001 the first Recommendations– non mandatory – on corporate governance were published by CMVM), and this regulation has been changing almost every year.

In spite of several difficulties with data availability and consistency among companies, we perform the analysis and conclude that disclosure degree is significantly related to size, type of auditor, listing status and economic sector (financial non-financial). Since the disclosure index is based on IAS 32 and IAS 39, the results also show that larger companies, companies listed on more than one exchange market and audited by international auditing companies are closer to the IAS requirements. We could not, however, prove the influence of corporate governance practices, including the board composition, on disclosure. Similarly, the results do not show a significant influence of the type of capital financing structure, since the measures of leverage degree and of importance of capital market's financing do not show statistically significant relations with disclosure level. These results, however, should be interpreted with caution. As previously mentioned, we found difficulties on data availability regarding the structure of shareholders, which did not allow us to proceed with a deep analysis of the effect of family ownership on disclosure practices. Moreover, regarding corporate governance characteristics, we also found several inconsistencies on disclosure by companies, namely the definition of independent director. The fact that, until 2003, there was not a clear definition of independence by the Portuguese capital markets regulator, led to a situation in which companies could disclose a number of independent directors that in fact are not independent in the light of current regulation. Our measures for the proportion of independent directors do not show significant relations with disclosure level.

This research brings important insights on the characteristics of Portuguese companies, their corporate governance and capital ownership structures, and on the reporting practices in the context of capital markets oriented accounting standards. This research allowed the identification of several areas for improvement and that call for the intervention of the Portuguese capital markets regulator.

Regarding corporate governance, the Portuguese capital markets regulator has been introducing several improvements. Additionally, CMVM has been publishing studies on the compliance degree with corporate governance recommendations regulations every year, disclosing the name of companies that do and do not comply. These procedures have a positive impact on corporate governance practices.

The supervision of listed companies financial reporting is the responsibility of CMVM. This function assumes much more importance in the context of mandatory adoption of IAS. In fact, the change to IAS means a complete change in the attitude toward financial reporting. We show that, before 2005, many companies were not applying IAS 32 and IAS

39 as supplementary accounting standards, nor complying with the Portuguese Accounting Directive 18. This is an indicator that there will be several problems of compliance with IAS after 2005. Effective enforcement mechanisms are needed. CMVM has been publishing the name of companies that have certified auditor's reports, which may not be enough for the enforcement of IAS. Similarly to what is done regarding corporate governance practices, the market supervisor must develop studies of compliance with IAS based on annual reports published by companies and implement actions towards non-complying companies.

Finally, we would like to address some limitations of this study. First, the sample size. This problem, which is intrinsic to the Portuguese capital market size, restricts our hypotheses testing by means of linear regression models. Another limitation results from the index construction process. We were very careful with the scoring process, but errors may have occurred. Furthermore, annual reports, although important, are not the only means by which companies disclose financial instruments. Lastly, this study covers the annual reports for a single year, before IAS became mandatory. Additional research including other years, namely after 2005, will allow interesting analyzes of evolution of disclosure practices and compliance by companies within new accounting frameworks. In spite of these limitations, we believe that this research revealed very interesting relations of the disclosure practices and several characteristics of Portuguese companies, showing the applicability of relevant theoretical frameworks in contexts not studied before and with important policy implications.

Appendix A

Components of the disclosure index

Disclosure index	Score (if disclosed)
<i>Accounting policies</i>	
Held for trading securities	1
Held-to-maturity securities	1
Loans and receivables originated by the enterprise	1
Available-for-sale financial assets	1
Held-for-trading liabilities	1
Other financial liabilities	1
Trade date vs settlement date	1
<i>Fair values and market values</i>	
Measurement method	1
Significant assumptions	1
Fair value changes in Available-for-sale financial assets	1
Amount recognised in equity	1
Amount removed from equity	1
<i>Unability of reliability in measurement</i>	
Financial assets description	1
Their carrying amount	1
Explanation of the reason	1
Range of estimates within which the fair value is likely to lie	1

(continued on next page)

Appendix A (continued)

Disclosure index	Score (if disclosed)
<i>Securitisation and repurchase agreements</i>	
Accounting policy	1
Nature and extent	1
Collateral	1
Whether the financial assets have been derecognised	1
Information about the key assumptions used in calculating the fair value of new and retained interests	1
<i>Derivatives — Accounting policies</i>	
Risk management policy, including hedging policy	1
Objectives of holding or issuing derivatives	1
Accounting policies and methods adopted	1
Monitoring and controlling policy	1
Financial controls	1
<i>Derivatives — Risks</i>	
Segregation by risk categories	1
Principal, stated value, face value, notional value	1
Maturity	1
Weighted average/effective interest rate	1
<i>Derivatives — Hedging</i>	
Hedging description	1
Accounting method	1
Financial instruments designated as hedging instruments	1
Fair values	1
Nature of the risks being hedged	1
<i>Future transactions hedging</i>	
The period in which forecasted transactions are expected to occur	1
The period they are expected to enter in income	1
<i>Cash-flow hedging</i>	
The amount recognised in equity	1
The amount removed from equity and recognised in income	1
The amount removed from equity and added to initial measurement of the acquisition cost	1
<i>Derivatives — Fair value</i>	
Fair value	1
Method adopted	1
Significant assumptions	1
Average fair value during the year	1
<i>Interest rate risk</i>	
Future changes in interest rates	1
Maturity dates	1
<i>Credit risk</i>	
Counterparties identification	1
Maximum amount of credit risk exposure	1
Significant concentration of credit risk	1

Appendix A (continued)

Disclosure index	Score (if disclosed)
<i>Collateral</i>	
Terms and conditions	1
Carrying amount and fair value	1
<i>Other</i>	
Impairment losses	1
Total interest income and total interest expense (separately)	1
In AFS, realized and unrealized gains/losses (separately)	1
<i>Total score</i>	54

Appendix B

Sample companies in alphabetic order

Company name	Economic sector	Company name	Economic sector
Barbosa and Almeida	Industrial	IFI	Consumer, cyclical
BANIF	Financial	Jerónimo Martins	Consumer, non-cyclical
BCA	Financial	LISGRAFICA	Consumer, cyclical
BCP	Financial	Mota-Engil	Industrial
BES	Financial	Mundicenter	Financial
BPI	Financial	NOVABASE	Technology
BRISA	Industrial	Soc. Comercial Orey Antunes	Industrial
BSCH	Financial	Papelaria Fernandes	Consumer, cyclical
Banco Totta and Açores	Financial	PARAREDE	Technology
Corticeira Amorim	Industrial	PORTUCEL Produtora de Pasta e Papel	Basic materials
Companhia de Celulose do Caima	Industrial	PT Multimédia	Consumer, cyclical
CENTRAL — Banco de Investimento	Financial	REDITUS	Technology
CIMPOR	Industrial	Salvador Caetano	Industrial
CIN	Basic materials	Soares da Costa	Industrial
CIRES	Basic materials	SAG GEST	Consumer, cyclical
COFINA	Basic materials	SEMAPA	Industrial
COMPTA	Technology	SOMAGUE	Industrial
Modelo Continente	Consumer, non-cyclical	SONAE Indústria	Industrial
EDP	Utilities	SONAE SGPS	Consumer, non-cyclical
EFACEC	Industrial	SONAE.COM	Telecommunications
Estoril — Sol	Consumer, cyclical	SUMOLIS	Consumer, non-cyclical
F Ramada	Basic materials	Teixeira Duarte	Industrial
FINIBANCO	Financial	Portugal Telecom	Telecommunications
FISIPE	Basic materials	TERTIR	Industrial
Grão-Pará	Industrial	Vista Alegre Atlantis	Consumer, cyclical
IBERSOL	Consumer, cyclical	Vodafone Telecel	Telecommunications
IMOLEASING	Financial		
IMPRESA	Consumer, cyclical		
INAPA	Basic materials		

Appendix C

Conclusions

	Tassets	Lassets	Tsales	Lsales	Indl	D and	D list	Mult	De	My	Ind dir	D ind dir	Corp gov	Idisc a
Tassets	1 000													
Lassets	0 558	1 000												
Tsales	0 966	0 650	1 000											
Lsales	0 473	0 896	0 612	1 000										
Indl	0 421	0 560	0 372	0 297	1 000									
D and	0 096	0 349	0 144	0 407	0 121	1 000								
D list	0 551	0 601	0 578	0 521	0 358	0 179	1 000							
Mult	0 168	0 048	0 192	0 164	0 182	0 091	0 084	1 000						
De	0 286	0 624	0 275	0 422	0 851	0 109	0 279	0 170	1 000					
My	-0 130	0 214	0 119	-0 073	-0 306	0 211	0 019	0 129	0 372	1 000				
Ind dir	-0 002	0 311	0 076	0 246	0 161	0 307	0 241	0 186	0 061	0 148	1 000			
D ind dir	0 185	0 148	0 135	0 075	0 302	0 175	0 230	0 055	0 272	-0 189	0 106	1 000		
Corp gov	0 352	0 559	0 408	0 563	0 261	0 410	-0 479	0 094	0 227	0 036	0 159	0 330	1 000	
Idisc a	0 251	0 281	0 271	0 273	0 118	0 267	0 350	0 010	0 237	-0 108	0 071	0 195	0 161	1 000

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The use of intellectual capital information in investment decisions

An empirical study using analyst reports

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Abstract

Do financial analysts convey intellectual capital information in their recommendations? This study of a sample of analyst reports on large, listed Spanish companies provides some evidence on the question. Analysts usually report information regarding a company's strategy, customers, and processes; they less often provide information about research, development, and innovation. When controlling for endogeneity, we find that certain firm characteristics appear to influence the use of intellectual capital information. Analysts use this information in the case of highly profitable companies. The results also show a significant effect of growth opportunities on intellectual capital disclosure by financial analysts. © 2007 University of Illinois. All rights reserved.

Keywords: Intellectual capital, Financial analysts, Valuation, Intangible assets, Voluntary disclosure, Capital markets

1. Introduction

Increasing competition, development of new business sectors, and technological advances have generated some frustration over traditional financial statements (FASB, 2001b). Financial statements suffer from a lack of timeliness, (some) inaccuracy, and a limited ability to convey prospective data and risks facing the firm. In this context, financial analysts, as information intermediaries, are increasingly aware of the importance of company information that is not directly reflected in financial statements. Intangibles have become an important source of corporate value and firm wealth in our era of globalization,

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technological change, and knowledge-intensive processes. We know little about the way financial analysts use this information.

The first objective of our study is to quantify the extent and type of disclosure of intangibles in financial analyst's reports. The underlying methodology is a comprehensive analysis of the disclosure of intangibles in 260 analyst reports for Spanish listed firms from 2000 to 2003.

Our results show that financial analysts focus on particular intellectual capital information. In more than 70% of the reports, they cite information about new investments, firm credibility, and consistency of strategy, as well as its strategic alliances and agreements. They do not place a great deal of emphasis on measures of innovation, research, and development, probably because it is difficult to obtain these data and there is also a risk that the release of such information could be beneficial to competitors.

After studying the intellectual capital information included in analyst reports, we analyze the determinants of these disclosures on intangibles. The second objective of this study is to evaluate to what extent international firm listing, profitability, firm risk, and type of analyst recommendation influence intellectual capital information use. The regression-based approach constructed in this paper takes into account the endogenous relation between the use of intellectual capital information by financial analysts and their recommendations. Since in the presence of endogeneity, ordinary-least-squares estimation yields biased and inconsistent coefficient estimates, we base our analysis on a two-stage-least-squares estimation.

We find that, as predicted, the firm's profitability influences the extent of intellectual capital information use. Analysts provide more intellectual capital information in reports on profitable firms. The empirical analysis also shows a significant effect of growth opportunities on intellectual capital disclosure. In firms with high market-to-book ratios, analysts tend to include more intellectual capital information to justify their recommendations. Some of the variation in the amount of disclosure of intangibles is also explained by year, type of analyst report, and industry.

Analysis of the content of reports provides some evidence of the role of analysts as intermediaries between managers and investors. These results may help to improve methodologies to assist investment decision makers. The findings also have direct implications for accounting and financial-reporting policy. The influence of intangibles in modern corporations has led policy makers and accounting standard-setting boards to consider proposals to enhance information on intangibles in corporate financial reports. In order to establish a policy, one needs to know how investment analysts, as sophisticated consumers of financial information, actually use both financial and non-financial information (Schipper, 1991).

The remainder of this paper is organized as follows: Section 2 provides background for the analysis of non-financial information used by financial analysts; the methodology and study design are discussed in the third section; the fourth section presents the test results; and the final section of the paper summarizes the conclusions, describes limitations, and discusses implications for future research.

2. Related research

Prior research has shown that non-financial information is relevant for making investment decisions, but there is little evidence to tell us how much importance financial analysts place on intellectual capital information.

Bouwman, Frishkoff, and Frishkoff (1987) show that analysts generally use financial information primarily as a screen for early rejection of unacceptable investment candidates. The development of a positive case for a company appears to be based on information about segments, products, and markets. Chung and Meador (1984) report that analysts find market dominance, the presence of a sound, strategic plan, and planning systems to be of great importance in stock valuation, a result confirmed in a survey by the Financial Executives Research Foundation. Its "Investor Information Needs and Annual Report (1987)" indicates that analysts particularly value competitive position and management goals. Beattie (1999) survey of 154 users of accounting information identifies the quality of management as the key factor determining company performance. A Dempsey, Gatti, Grinell, and Cats-Baril (1997) survey of 420 financial analysts reports that management experience, potential competition, market share, and brand awareness are some of the most common measures used. While surveys may give us some useful descriptions of the perceived needs of financial analysts, they do represent subjective attitudes. The mere fact of using a questionnaire or interview format may also influence the results (Rogers & Grant, 1997, p. 19; Breton & Taffler, 2001, p. 92).

Another approach is to start with analyst reports. Examples of content-analysis approaches include Previs, Bricker, Robinson, and Young (1994), Rogers and Grant (1997), Breton and Taffler (2001), Orens and Lyabert (2004).

In their examination of 479 sell-side analyst company reports, Previs et al. (1994) find that financial analysts make extensive use of non-financial information, including company risks and concerns, competitive position, quality of management, and strategy. Rogers and Grant (1997) analyze 187 analyst reports, and note that the narrative sections of annual reports are cited almost twice as often as the financial statements. Breton and Taffler (2001) explore 105 sell-side analyst reports. They conclude that financial analysts examine firm management, strategy, and trading environment when making an investment recommendation. Management issues appear to dominate analysts' rationales for recommendations. In 50 analyst reports, Orens and Lyabert (2004) find that the items most often mentioned are strategy of the company, products, and segments.

Very few authors look specifically at intangibles for a comprehensive analysis of analyst reports. Arvidsson (2003) is one. She analyzes 105 analyst reports on knowledge-intensive companies in Nordic countries, using a disclosure index of 81 items classified into five categories: human, relational, organizational, R&D, and environmental/social. Her disclosure scores show that financial analysts focus primarily on information regarding R&D and customers, and include little information on organizational or human capital. Analyst reports on internationally listed companies are more likely to include more information on intangibles.

To the best of our knowledge, there is no evidence in the literature on firm-specific influences like risk, or analyst-specific influences like analyst recommendation or brokerage house.

3. Methodology and design

This study examines how much financial analysts use intellectual capital information in their reports and whether there is a relationship between some specific variables and information on intangibles. Our study sample consists of a set of 260 full-text sell-side analyst reports on Spanish listed companies.

Table 1
Classification of the analyst reports

Variable	Category	2000	2001	2002	2003	Total
Brokerage house	National	10	26	31	26	93
	"	3.85	10	11.9	10	35.8
	International	56	43	34	34	167
	"	21.5	16.5	13.1	13.1	64.2
Type of recommendation	Buy	54	46	36	27	163
	%	20.77	17.69	13.85	10.38	62.69
	Hold	9	16	21	26	72
	%	3.462	6.154	8.077	10	27.69
	Sell	3	7	8	7	25
	%	1.15	2.69	3.08	2.69	9.62
Report	Company report	29	23	27	26	105
	%	11	9	10	10	40
	Result report	37	46	39	33	155
	"	14	18	15	13	60
N		66	69	65	60	260

Table 1 presents the classification of the entire sample of analyst reports and the entire sample period (2000–2003) according to the year, brokerage house, and type of recommendation. The National brokerage houses are *Urquijo Bolsa*, *Banesto Bolsa*, and *Ahorro Corporación*; the International brokerages houses are: *J.P. Morgan*, *Morgan Stanley*, *ABN AMRO*, and *Merrill Lynch*. The types of recommendation are: Buy, Hold, and Sell. Reports are classified as company reports or result reports. Company reports are issued to explain changes in firm strategy or new alliances; result reports are reports issued after annual, half-year, or quarterly result announcements.

Spain is characterized by strong uncertainty avoidance, low individualism, limited investor protection, and a general acceptance of imposed norms. Typical shareholders are banks and industrial firms, which has some implications for firms' communication strategies. Current recommendations for Spanish accounting reform encourage more reporting on the intangible determinants of a firm's position (Libro Blanco, 2002). As more Spanish companies voluntarily include information on intangibles in financial statements and other communications with analysts, more data have become available.

The reports we examine were issued from 2000 to 2003. Seven top-ranked brokerage houses participated in the research: *ABN AMRO*, *Banesto Bolsa*, *Ahorro Corporación*, *J.P. Morgan*, *Merrill Lynch*, *Morgan Stanley*, and *Urquijo Bolsa*. Following Previs et al. (1994), we study four one-year periods in order to take account of different business conditions.^{1,2}

Most of the information included in the analyst reports was obtained through company presentations to analysts. To enable the greatest transparency, a company immediately informs the National Commission of the Stock Exchange (CNMV) of any decision to hold a meeting with analysts. In a meeting all the documentation relating to points on the agenda is made available from the moment of the official publication of the call notice on the website of the CNMV. A company must provide an initial broad distribution of the information to meet the regulatory requirements of the Stock Exchange that material or price-sensitive information reported to financial analysts must be sent before the meeting.

We follow the industry classification of the Madrid Stock Exchange Index. The industries considered are: Banks and Financial Services; Utilities; Food, Beverage and Tobacco; Construction; Metalworking; Petrochemical; Communication; Other Industries and Services; and New Technology.

Table 2
Sample distribution by industry

Industry	Number of reports	% Reports
Banks and financial firms	22	8.46
Utilities	42	16.15
Food, beverage, tobacco	13	5.00
Construction	54	20.77
Metalworking	11	4.23
Petrochemical	13	5.00
Communication	18	6.92
New technology	61	23.46
Other industries and services	26	10.00
Total	260	100

Madrid Stock Exchange industry classifications

Analyst reports follow a similar format. A summary provides the principal arguments behind the recommendation. Reports average 12 pages and include information on the company's market position, business segments, intra-industry comparisons, and company performance. Analyst arguments reflect the essential factors that support recommendations about stock's intrinsic value versus its market value.

Reports are either *result* reports or *company* reports. *Result* reports are issued after announcements of quarterly or annual results and form a basis for analyst communications with managers in either telephone or face-to-face interviews (Barker, 1998). *Company* reports are more extensive; they give a general vision of the business or elaborate on specific issues such as mergers, new products, or changes in strategy.

No more than one type of analyst report for each firm, time period, or brokerage firm is collected. When several reports fulfilling the conditions are available, one is selected randomly. An analyst report must include an unambiguous buy, hold, or sell recommendation, and financial information on the firm must also be available.

Table 1 describes the sample by year, type of brokerage house, recommendation, and report. Note that analysts are quite reluctant to issue a negative opinion: in only 9.62% of the sample do they express a sell recommendation. According to Bradshaw, Richardson, and Sloan (2001), investors typically interpret a hold recommendation to mean sell. Analysts show different tendencies in the issuance of positive and negative opinions over the different business conditions experienced in the research period ($\chi^2 = 17.979$; $p = 0.000$). Table 2 shows the sample distribution by industry. The numbers of buy, hold, and sell recommendations by industry segment are shown in Table 3.

3.1 Hypotheses

We use univariate and multivariate analysis to measure the importance of intellectual capital information items by how often they occur in the text. Then we explore the relation between the frequency of occurrence and some particular characteristics. We use the literature as a guide on some factors that might influence the extent of intellectual capital disclosure.

Table 3
Sample distribution by industry and recommendation

Industry	Buy	Hold	Sell	Total
Banks and financial firms	12	8	2	22
Utilities	22	16	4	42
Food, beverage, tobacco	7	5	1	13
Construction	33	18	3	54
Metalworking	8	2	1	11
Petrochemical	4	8	1	13
Communication	15	3	0	18
New technology	17	2	7	26
Other industries and services	45	10	6	61
Total	163	72	25	260

Buy is a dummy variable that takes a value of one if the report has a buy recommendation, Sell is a dummy variable that takes a value of one if the analyst report has a sell recommendation and Hold is a dummy variable that takes a value of one if the report has a hold recommendation. Madrid Stock Exchange industry classifications.

We pose four hypotheses:

H1. Intellectual capital information used by financial analysts is positively related to a firm's international listing.

Cooke (1989), Hossain, Tan, and Adams (1994), Hossain, Tan, and Adams (1995), Robb, Single, and Zarzeski (2001) find international listing to be a significant determinant of disclosure levels. According to Cooke (1989), when a firm is listed on an international market, it will disclose more detailed information because it may need to conform to more disclosure rules and more disclosure may attract additional analyst coverage. It may be expected then that an internationally listed firm will also make more extensive disclosures on intangibles.

The results in García-Meca, Parra, Larrán, and Martínez (2005) reveal it is more likely that an internationally listed company will have a proactive strategy of disclosing intellectual capital to financial analysts. This implies easier access to intellectual capital information. We also assume analysts will rely more heavily on information about intellectual capital when companies are listed on international exchange markets.

H2. Intellectual capital information used by financial analysts is positively related to profitability.

When company performance is good, companies will want to signal that to investors. Singha and Desai (1971) suggest that higher profitability motivates managers to provide more information in order to improve their own compensation arrangements and obtain personal advantages. Disclosure of intangibles may be one form of added information disclosure. Accordingly, analysts should be expected to have easier access to information about a profitable company's intellectual capital.

H3. Intellectual capital information used by financial analysts is related to the type of recommendation.

Analysts' assessments are disclosed to brokerage clients in the form of recommendations to buy, hold, or sell stocks. Cognitive biases and analysts' incentives are the two main

determinants of positive-recommendation tendencies analyzed thus far (García-Ayuso, 2003). First, analysts working for investment banks appear to be more likely to issue optimistic forecasts on the companies their firms underwrite (Michaely & Womack, 1999). Second, an optimistic bias will tend to improve analysts' compensation.

Analysts may thus focus on non-financial information such as strategy, customer, or management to justify their frequent positive recommendations. Breton and Taffler (2001) find greater use of non-financial information in reports that include buy recommendations. We hypothesize that buy reports will include more intellectual capital information than other reports.

H4. Intellectual capital information used by financial analysts is positively related to firm risk.

Lev (2001) finds that the risk associated with R&D is on average three times greater than the risk associated with physical investment in property, plant, and equipment. Riskier companies tend to be subject to greater public scrutiny and pressures for information. Analysts who report some information on intangibles give investors reassurance about the value drivers in risky companies. Thus, risk is indicative of uncertainty and gives analysts the opportunity to gain from information acquisition, which would mitigate the uncertainty. We expect analysts to provide more information on intangibles in riskier companies, because of the greater demand for informative analyst research.

3.2. Dependent variable: analyst disclosure index

A distinctive feature of our research design is development of a proxy for the use of the analyst's intellectual capital information. Self-constructed indexes have been applied to annual reports to estimate voluntary information (Gray, Meek, & Roberts, 1995; Adrem 1999; Williams, 1999; Ferguson, Lam, & Lee, 2002); compulsory information (Ahmed & Nichols, 1994; Wallace, Naser, & Mora, 1994; Jaggi & Low, 2000); or both (Giner Inchausti, 1997; Richardson & Welker, 2001).

The major drawback of a disclosure index is subjectivity; it is hard to replicate such analysis. There are no theoretical guidelines for selecting items, and successful application of the disclosure indexes depends on critical and careful selection. Yet, Marston and Shrives (1991) observe that the wide use of indexes indicates their usefulness as a research tool.

We use a self-constructed index that we call the Analyst Disclosure Index (ADI), which reports the percentage of intellectual capital items disclosed over a predefined list of items considered communicable by the analyst. The index consists of 60 different items, each taking a value of one if the item is included in the analyst report and zero otherwise. Thus, it is a ratio of the particular measure to the total score that an analyst may communicate. A company is not penalized for a lack of disclosure on items that are irrelevant to its circumstances. The items are developed following an index derived by Bukh, Nielsen, Gormses, and Mouritsen, (2004) and the literature concerning disclosure (Cooke, 1989) and intellectual capital (Edvisson & Malone, 1997; Guthrie, 2001; Mouritsen, Larsen, & Bukh, 2001; Guthrie, Johanson, Bukh, & Sánchez, 2003). After totalling the values of the 60 items in the index, we adjust scores by dividing the total value of the index by the maximum number of relevant items for each firm.

The literature on intellectual capital proposes different ways both to define and to classify intangibles. There is no general agreement on boundaries between categories or

into which category a certain type of intangible falls. We follow Bukh et al. (2004), and divide the items into five different categories or groups: *Human capital*; *customers*; *organizational*; *innovation, research, and development*; and *strategy*. These categories serve to provide a structured vision of the resources available to a company.

Guthrie et al. (2003) suggest several ways to improve reliability in recording and analyzing the data. First, categories should be based on well-grounded, relevant literature, and should be clearly defined. Second, the coding instrument must be reliable, with well-specified decision categories and decision rules. Third, coders must be trained, and coding decisions made on a pilot sample must reach an acceptable level.

The five categories of the index are found to be central to most of the previous classifications of intangibles, and all the measures included have merit in providing information on the value-creation potential of intellectual capital. Following Hail (2002) and Arvidsson (2003), we assess the validity of the disclosure index using Cronbach's alpha. It evaluates how well a set of items – namely, the five categories of intellectual capital – measures a common entity, in this case intellectual capital information. If the inter-correlation among items is high, the items measure the same construct. Our Cronbach's alpha is 0.6368, indicating internal consistency in the disclosure scores.

3.2.1. *Human capital*

Human capital is one of the most commonly cited intangibles. In this group we include 16 items related to the knowledge, skill, and abilities of managers and employees. Human-capital elements vary significantly depending on the type of company; they may be more important for some firms and less important for others. We consider:

- Standard information about personnel and managers and we include an analysis of employees by age, experience, value-added, and productivity.
- More detailed information, such as education and training policies, remuneration policy, dependence on key employees or career opportunities.

Similar items are included in other studies of intellectual capital, such as Loro (2002), Arvidsson (2003), and Bukh et al. (2004).

3.2.2. *Customers*

Sveiby (1997) defines “relational resources” and Arvidsson (2003) “relational capital” as general classifications. Like Kaplan and Norton (1996) or Bukh et al. (2004), we use a customer category, which assumes a company wants to build good long-term relations with its customers.

Customer relations are an important contributor to competitive advantage as a determinant of company performance. The customer category includes 13 items based on general information (e.g., new customers, market share, sales breakdown) and on more detailed information (e.g., customer relationships, dependence on key customers).

3.2.3. *Organization*

Organization is a common category of intangibles in classification schemes. It expresses the ability to operate in a coordinated manner using the resources available to a company. The

literature provides several suggestions about which items to include under organization. Corporate culture can be defined as the invisible structure that creates norms and rules that influence employees' actions (Itami & Roehl, 1987). Barney (1991) includes controlling and coordinating systems and formal reporting structure. Andreu and Ciborra (1996) include IT systems that support the firm's work practices and facilitate communication across the company. Collins and Montgomery (1995) note that a company's routines, processes, and culture are fundamental.

The organization category comprises 13 items; some examples are IT systems, corporate culture, organizational structure, and efficiency.

3.2.4. Innovation, research, and development

The fourth category relates to a firm's ability to learn and improve; it is applicable to more than high-technology companies.

Most authors who examine intangibles include this category in classification structures (Loro, 2002; Meritum, 2002; Bukh et al., 2004). Low (2000) and Bosworth and Rogers (2001) confirm that both R&D expenditures and patent activity are positively related to a firm's market value. Lev and Sougiannis (1996) also report that R&D is associated with subsequent stock returns.

Innovation, research, and development includes six items such as patents pending, future projects and basic research. We do not expect to see much information in this category in analyst reports, because there is little voluntary disclosure of this information in Spain (Larrán Jorge, 2001; García-Meca et al., 2005).

3.2.5. Strategy

Strategy performs a central role in the understanding of intellectual capital, allowing a complete and critical interpretation of intangible assets (Loro, 2002). This category requires the most analysis to identify the value drivers.

The majority of the information in this category is qualitative in nature: e.g., product description, alliances, social responsibility. It covers the firm's business model and the competitive environment in which it operates. Strategy is closely related to a company's reputation. Environmental attention, leadership, and strategic alliances improve financial performance and thereby contribute to a firm's competitive advantage.

There is evidence that these intangible assets have relevance for a firm. Verschoor (1999) finds a positive relation between a strong ethical commitment and firm performance. Some authors find corporate social responsibility to be positively related to a firm's profitability (Stanwick & Stanwick, 1998; Simpson & Kohers, 2002). Hillman and Keim (2001) note that shareholder value is increased when the firm invests in socially responsible activities.

3.3. Methodology

A Kruskal–Wallis and Mann–Whitney *U*-test of variance are used for each variable across firm-years to determine any substantial change in characteristics of analyst reports over the period.

We regress the analyst disclosure index against various variables to gauge the impact of a variable on the disclosure of intellectual capital. We estimate a linear regression by ordinary least squares. The analysis is based on the multiple-regression model:

$$ADI = \alpha_0 + \alpha_1 \text{Int_list}_{it} + \alpha_2 \text{Pro}_{it} + \alpha_3 \text{Buy}_{it} + \alpha_4 \text{Hold}_{it} + \alpha_5 \text{Beta} + \alpha_6 L_M_{it} \\ + \alpha_7 M/B + \alpha_8 \text{Report}_i + \alpha_9 \text{Broker_H}_{it} + Y_t + \sum \text{Ind}_{it} + \varepsilon_{it}.$$

The independent variables in this study are the following:

International Listing (In list): a dummy variable with a value of one if the firm is listed on an international market exchange (international listing status), and zero otherwise.

Profitability (Pro): measured by the rate of net profit divided by book value of equity.

Recommendation: measured by three dummy variables: buy, hold, or sell recommendations.

Firm risk (β): measured using firms' historical stock returns.

We control for other variables that may affect the results. Firm size, one control variable, is measured by the logarithm of market value (L_M) as of the end of the year. Corporate size, as measured by assets, turnover, or capitalization, has been positively associated with firm disclosure levels in numerous studies, suggesting that larger companies follow better disclosure practices than smaller companies (see, e.g., Cerf, 1961; Cooke, 1989; Wallace et al., 1994; Giner Inchausti, 1997; Bozzolan, Favotto, & Ricceri, 2003).

Financial analysts thus have easier access to information related to a larger company's intangibles. Larger firms also experience both greater information demand from financial analysts (Lang & Lundholm, 1993) and lower information production costs (Leftwich, Watts, & Zimmerman, 1981; Giner Inchausti, 1997). At the same time, analysts may have more incentives to reduce uncertainty by disclosing information on intangibles related to smaller companies, which seem more risky to investors.

The *market value to-book value* of equity (M/B) is the second control variable. This variable has been considered as a proxy of growth opportunities (Frankel, Kothari, & Weber, 2006). Edvissan and Malone (1997) and Sveiby (1997) posit that the difference between the market value and book value of a company's equity lies in an organization's intangible elements which cannot be expressed in conventional financial statements. Tasker (1998) shows that managers of firms with relatively uninformative financial statements who are more likely to have private information not reflected in the financial figures are more likely to use private channels to bridge the information gap. We expect more information on intangibles in companies with high levels of market-to-book ratio because of their higher information asymmetry. García-Meca et al. (2005) also show that the higher the market-to-book ratio, the more information on intangibles disclosed to analysts in private meetings.

Type of report (Report), the third control variable, takes a value of one for a result report and zero for a company report. We would expect more disclosure of intangibles in reports explaining changes in firm strategy or new alliances (company reports), where there would be considerable information asymmetry between managers and investors. We would expect less disclosure of intangibles in result reports issued after annual, half-yearly, or quarterly results.

Brokerage house (Broker H) is a control variable that takes the value of one for an international brokerage house and zero otherwise. We would expect more disclosure in

Table 4
Model specification and variable measurement

Variable	Definition	Sign prediction
<i>Test variables</i>		
Int_list	Dummy = 1 when the analyst report is issued about a firm listed on an international market; 0 otherwise	-
Prof	Rate of net profit divided by the book value of equity	+
Buy	Dummy = 1 when the analyst report has a buy recommendation; 0 otherwise	-
Hold	Dummy = 1 when the analyst report has a hold neutral recommendation; 0 otherwise	
Sell	Dummy = 1 when the analyst report has a sell recommendation; 0 otherwise	
Beta	Firm-specific risk	+
<i>Control variables</i>		
L_M	Logarithm of firm market value at the end of the year	+
M/B	Market value to book value of equity	+
Report	Dummy = 1 for a result report, and 0 for a company report	
Broker_H	Dummy = 1 for an international brokerage house; 0 otherwise	-
Y_2000	Dummy = 1 for a report is issued in 2000 year; 0 otherwise	
Y_2001	Dummy = 1 for a report is issued in 2001 year; 0 otherwise	
Y_2002	Dummy = 1 for a report is issued in 2002 year; 0 otherwise	
Ind_1	Dummy = 1 for a report in the Banks and financial industry; 0 otherwise	
Ind_2	Dummy = 1 for a report in the Utilities industry; 0 otherwise	
Ind_3	Dummy = 1 for a report in the Food, beverage and tobacco industry; 0 otherwise	
Ind_4	Dummy = 1 for a report in the Construction industry; 0 otherwise	
Ind_5	Dummy = 1 for a report in the Metal working industry; 0 otherwise	
Ind_6	Dummy = 1 for a report in the Petrochemical industry; 0 otherwise	
Ind_7	Dummy = 1 for a report in the Communication industry; 0 otherwise	
Ind_8	Dummy = 1 for a report in the New technology industry; 0 otherwise	

international brokerage houses because these analysts have better information resources. We also control for *year* and *industry* by using dummy variables. Y_t represents temporal effects (year dummies); $\sum \text{Ind}_i$ represents industry effects (industry dummies); and ε_{it} is the error term.

We retrieved risk information from the JCF database and financial information from the web page of the Spanish National Commission of the Stock Exchange. Table 4 provides an overview of the variables.

The descriptive statistics for the continuous variables are shown in Table 5. Table 6 presents correlation coefficients across the variables.

4. Empirical results

Table 7 summarizes the results of the disclosure scores for the analyst reports. In the 260 reports, financial analysts include, on average, 14.88% of the checklist items. They focus primarily on two categories: *Customers* and *Strategy*. They include the most information on *Strategy*, 35.16% of the items. *Customers* is the second-most cited category, at 25.65%.

Reports include, on average, only 3.65% of *Human Capital* items and 3.63% of *Innovation, Research, and Development* items. FASB's (2001a) examination of voluntary

Table 5

Descriptive statistics for continuous variables

	L_M	Prof	Beta	M/B
Mean	15.769	0.079	0.825	4.226
S.D.	1.376	0.129	0.584	3.311
Skewness	0.636	0.665	0.967	1.610
Kurtosis	-0.076	10.577	1.720	2.728
Q1	14.610	0.040	0.460	1.982
Median	15.566	0.069	0.710	2.577
Q3	16.710	0.121	1.180	5.993

Table 5 reports the descriptive statistics of the continuous variables of the study. L_M: logarithm of market valuation; Prof: profitability; Beta: systematic risk of the firm as of the end of the year; M/B: market value to book value of equity ratio

disclosures also shows that disclosures about research and development activities and product development are generally few and far between. Fear of competitive disadvantage is likely to be the reason. According to Barker (1999), the predicted payoffs of R&D are so unreliable that investment in innovation is one of the least useful information sources for financial analysts. These results are consistent with conclusions in Marston (1996) and Larrán Jorge (2001).

The limited citation of *Human Capital* items is consistent with surveys (Eccles & Mavrinac, 1995; Dempsey et al., 1997) and with empirical studies of analyst reports (Arvidsson, 2003) that conclude employee measures are on average of little use to financial analysts. According to Johanson (2003), disclosures on human resources are problematical because these intangibles are not firm-owned.

Table 6

Pearson correlation coefficients

	ADI	Int_list	Prof	M/B	Buy	Hold	Beta	L_M	Report	Broker_H
ADI	1.00									
Int_list	-0.08	1.00								
Prof	0.20**	-0.02	1.00							
M/B	0.43**	0.04	0.19	1.00						
Buy	0.33**	0.03	0.15	0.09	1.00					
Hold	-0.27**	0.00	0.06	0.11	-0.80**	1.00				
Beta	0.20**	0.89	0.57	0.55**	0.06	-0.09	1.00			
L_M	0.00	0.21**	-0.26**	0.04	-0.06	0.04	-0.04	1.00		
Report	0.62**	0.00	-0.13*	-0.18**	-0.31**	0.31**	-0.07	-0.05	1.00	
Broker_H	-0.03	0.04	0.08	-0.04	0.03	0.00	-0.03	-0.17**	0.07	1.00

ADI: Analyst Disclosure Index; Int_list_{*it*} is a dummy variable that takes a value of one if the report is issued for an international listing firm; Prof_{*it*} is the profitability ratio; M/B_{*it*} is the market-to-book ratio; Buy_{*it*} is a dummy variable that takes a value of one if the report contains a buy recommendation; Hold_{*it*} is a dummy variable that takes a value of one if the analyst report has a hold recommendation; Beta is the systematic firm risk; L_M_{*it*} is the logarithm of market value at the end of the year; Report_{*it*} is a dummy variable that takes a value of one if it is a result report and zero if it is a company report; Broker_H_{*it*} takes a value of one if it is an international brokerage house

* $p < 0.05$; ** $p < 0.01$.

Table 7
Descriptive statistics of disclosure scores

	Analyst Disclosure Index	Categories of intellectual capital				
		Human capital	Customers	Organizational	Innovation, research, and development	Strategy
Mean	14.88	3.65	25.65	15.15	3.63	35.16
Skewness	0.75	1.64	1.19	1.09	3.27	0.25
Kurtosis	0.83	2.92	0.69	1.43	15.00	−0.51
Q1	8.47	0.00	7.69	7.69	0.00	25.00
Median	13.11	0.00	15.38	15.38	0.00	33.33
Q3	19.67	6.25	38.46	23.08	0.00	50.00
N items	60	16	13	13	6	12

Table 7 presents descriptive statistics of disclosure scores for the entire sample of 260 analyst reports and for the entire sample period (2000–2003). Analyst Disclosure Index is the disclosure score on intangibles. The scores by categories are ratios of actual scores awarded to the maximum score in the group considered.

Table 8 summarizes the results by industry. We can see that financial analysts focus on intangibles primarily in Communication and New Technology industries; the lowest scores are found in Petrochemical and Metal Working.

The empirical findings are as follows. The Appendix details the complete results.

1. *Human Capital*. Management experience and abilities is the item mentioned most often (43.46%), which suggests that top-level management quality is an important issue

Table 8
Disclosure scores (mean) by industry

Industry	Analyst Disclosure Index	Categories of intellectual capital				
		Human capital	Customers	Organizational	Innovation, research, and development	Strategy
Banks and financial firms	14.25	3.13	24.13	11.89	1.95	34.09
Utilities	11.98	2.98	19.60	16.48	2.04	30.16
Food, beverage, tobacco	17.65	5.29	23.08	12.42	2.20	47.44
Construction	11.08	3.01	23.22	8.55	5.82	28.09
Metalworking	10.13	1.14	7.69	17.48	2.60	25.76
Petrochemical	9.46	2.40	11.83	15.38	1.10	24.36
Communication	20.04	5.90	35.90	17.52	3.97	44.91
New technology	19.02	4.30	34.80	17.40	5.62	40.98
Other industries and services	18.07	4.33	28.99	22.78	0.55	41.67
Total	14.88	3.65	25.65	15.15	3.63	35.16
χ^2	57.11**	10.76	38.96**	26.46**	18.78*	49.31**

Table 8 presents mean values of disclosure scores for the entire sample 260 of analyst reports and for the entire sample period (2000–2003). Analyst Disclosure Index is the disclosure score on intangibles. The scores by categories are ratios of actual scores awarded to the maximum score in the group considered. Madrid Stock Exchange industry classification

χ^2 = chi squared test.

* $p < 0.05$; ** $p < 0.01$.

for investors. According to Weetman and Beattie (1999), integrity, reliability, ability to explain, and performance in response to questions are aspects of management experience. Career opportunities and insurance policies are not commented on in our analyst reports.

2. *Customers.* More than 45% of reports distinguish customers by product or business. Market share by product (43.08%), new customers (38.08%), and information on relations with customers (21.54%) are the most frequently noted.
3. *Organizational.* Installed capacity (42.31%) and efficiency (42.69%) are the most valued items. Environmental policies (3.46%) or efforts related to the working environment (2.31%) are rarely used to justify investment recommendations.
4. *Innovation, Research, and Development.* Despite empirical evidence indicating that this kind of information is on demand by financial analysts (Eccles & Kahn, 1998), in our sample this information is rarely cited. Information on patents and licenses is the primary item (25.77%).
5. *Strategy.* New investments (98.82%), credibility and consistency of strategy (93.46%), new products (87.73%), strategic alliances and agreements (70.38%), and leadership (68.46%) are the items most noted by financial analysts. Environmental investments and social responsibility are the items represented least. Analysts do not seem influenced by the debate on investments in environmentally and socially responsible companies.

Table 9 reports the results of univariate hypothesis tests, which validate three of the four hypotheses. As expected, the statistics that test for differences between disclosures and profitability (H2), disclosures and recommendations (H3), and disclosures and beta (H4) are significant. There are differences in the scores of the analyst-disclosure index depending on the level of profitability ($p < 0.05$), nature of the recommendation ($p < 0.01$), and firm risk ($p < 0.01$). Contrary to expectations, the one-tailed Mann–Whitney U -test of a relation between international listing and disclosure (H1) is not significant. Analysts do not seem to include more intellectual capital information for internationally listed companies.

Table 10 presents the results for an ordinary-least-squares regression of all the analyst reports issued for the four-year period 2000–2003. A multivariate analysis of the explanatory and control variables simultaneously supplements the univariate results and controls for potential interactions among variables. As in the univariate results, profitability explains variations in disclosures in analyst reports ($p < 0.05$). This implies that financial analysts have easier access to information about a profitable firm's intellectual capital. The results support previous voluntary-disclosure research showing higher levels of voluntary disclosure in highly profitable firms.

The regression results confirm that the type of recommendation is positively related to analysts' use of intellectual capital. There is more intellectual capital information in buy reports ($p < 0.01$) than in sell reports. These findings mirror results in Breton and Taffler (2001), who present evidence of greater use of non-financial information in reports with positive recommendations.

The results also show that analyst behavior is affected by growth opportunities. Analysts justify valuations using intellectual capital information in companies with high market-to-

Table 9

Analyst Disclosure Index by international listing, profitability, recommendation, and beta

	N	Mean	S D	Statistic
Int_List				
0	87	15.747	8.505	$U=7209$
1	173	14.451	7.673	
Pro				
$-0.57 < \text{Pro} < 0.05$	86	12.107	7.390	$\chi^2=7.082^*$
$0.05 < \text{Pro} < 0.1$	86	13.364	6.831	
$0.1 < \text{Pro} < 0.62$	88	17.212	9.403	
Recommendation				
Buy	163	16.902	8.264	$\chi^2=74.78^{**}$
Neutral	72	11.236	5.003	
Sell	25	11.451	8.226	
Beta				
$-0.25 < \text{beta} < 0.5$	87	14.318	7.399	$\chi^2=14.475^{**}$
$0.5 < \text{beta} < 1.06$	86	12.538	6.300	
$1.06 < \text{beta} < 3$	87	17.841	9.568	

Int_List_{*i*} is a dummy variable that takes a value of one if the report is issued for an international listing firm. Prof_{*i*} is the profitability ratio. Buy_{*i*} is a dummy variable that takes a value of one if the report contains a buy recommendation. Sell_{*i*} is a dummy variable that takes a value of one if the analyst report has a sell recommendation. Beta is the systematic risk.

U =Mann–Whitney U -test; χ^2 =chi squared test.

* $p < 0.05$; ** $p < 0.01$.

book ratios ($p < 0.1$). Growth firms tend to have a high level of information asymmetry; managers are more likely to have private information that is not reflected in the firm's financial statements, and they may, therefore, disclose information voluntarily to mitigate the information gap. When firms have significant intangible assets, analysts also seem to supplement financial information by seeking their own private information to issue more precise forecasts and to compensate for the greater asymmetry. These results are consistent with the study findings of Barron, Byard, Kile, and Riedl (2002), Amir, Lev, and Sougiannis (2003), and Arvidsson (2003). These researchers find that analysts contribute the most to valuation in industries characterized by high proportion of intangibles and low informativeness of financial statements.

The sign on type of report is negative and significant ($p < 0.01$), which indicates financial analysts use intellectual capital information more often in company reports than in result reports. That is, intellectual capital information is commonly cited in reports issued to explain changes in firm strategy or a new alliance, and less often cited in reports to announce annual, half-year, or quarterly results.

Listing status does not influence the extent of intellectual capital information in analyst reports. Contrary to expectations (and the univariate results), neither does firm risk influence the use of intellectual capital information when the other variables are considered. This is perhaps because riskier companies have higher market-to-book ratios. We do not find any influence of size on the extent of disclosure of intellectual capital in analyst reports. It may have to do with the small differences across the sample. All the companies are listed on the Spanish stock exchange, and their

Table 10
Regression model results

Variable	Coefficient	S.E.	VIF
C	16.064***	5.358	
Int_list	−0.430	0.913	1.501
Pro	7.140**	3.088	1.673
M/B	0.387*	0.217	2.679
Buy	4.326***	1.462	3.196
Hold	1.821	1.390	3.232
Beta	−0.406	1.154	2.679
L_M	0.378	0.349	2.186
Report	−7.600***	0.785	1.208
Broker_H	0.272	0.702	1.113
A2000	−5.042***	1.182	1.969
A2001	−5.645***	0.946	1.723
A2002	−4.923***	1.150	2.151
Ind_1	−4.406**	2.155	1.446
Ind_2	−3.040*	1.651	2.916
Ind_3	−0.379	2.455	1.527
Ind_4	−4.694***	1.476	3.113
Ind_5	−5.024***	1.622	1.437
Ind_6	−4.949**	2.150	2.038
Ind_7	1.095	2.281	1.963
Ind_8	0.436	2.071	3.735
N			260
Adjusted R squared			0.633
Standard error			4.943
F-value			20.386
p-value			0.000

Table 10 contains ordinary least squares (OLS) estimation results for the sample of 260 analyst reports of the model:

$$ADI = \alpha_0 + \alpha_1 \text{Int_list} + \alpha_2 \text{Pro} + \alpha_3 \text{Buy} + \alpha_4 \text{Hold} + \alpha_5 \text{Beta} + \alpha_6 \text{L_M} + \alpha_7 \text{M_B} + \alpha_8 \text{Report} \\ + \alpha_9 \text{Broker_H} + \gamma + \sum \text{Ind}_i \quad i = 1, \dots, 8$$

ADI: Analyst Disclosure Index, Int_list is a dummy variable that takes a value of one if the report is issued for an international listing firm, Pro is the profitability ratio, M/B is the market-to-book ratio, Buy is a dummy variable that takes a value of one if the report includes a buy recommendation, Hold is a dummy variable that takes a value of one if the analyst report includes a hold recommendation, Beta is the systematic risk, L_M is the logarithm of market value at the end of the year, Report is a dummy variable that takes a value of one if it is a result report and zero if it is a company report, Broker_H takes a value of one if it is an international brokerage house, Y2000 is the dummy variable for the 2000 year, Y2001 is the dummy variable for the 2001 year, Y2002 is the dummy variable for the 2002 year, Ind_1 is the dummy variable for Banks and financial firms, Ind_2 is the dummy variable for Utility industry, Ind_3 is the dummy variable for Food, beverage and tobacco industry, Ind_4 is the dummy variable for Construction industry, Ind_5 is the dummy variable for Metal working industry, Ind_6 is the dummy variable for Petrochemical industry, Ind_7 is the dummy variable for Communication industry, and Ind_8 is the dummy variable for New technology industry.

Significant at 1% (***), 5% (**) and 10% (*) levels.

VIF: Variance Inflation Factor

Data calculated using the White heteroskedasticity-consistent standard errors and covariance matrix

information costs are very similar. This result is robust to different definitions of firm size: natural logarithm of turnover, number of employees, and natural logarithm of total assets.

The negative and significant signs ($p < 0.01$) on the dummy year variables indicate that information in analyst reports issued in 2003 is better than information in the reports issued in other years. The dummy variables representing the Construction, metalworking, and petrochemical industries are also significant and negative. The negative coefficient, according to our dummy variables, indicates that disclosures about intangibles occur less often in these non-knowledge-intensive industries. Although other research indicates that investors and analysts engaged in knowledge-intensive industries find intellectual capital information useful in estimating value (Mavrinac & Boyle, 1996; Mavrinac & Siesfeld, 1997; Bukh et al., 2004), the industry variables for knowledge-intensive companies in our study (Communication and new technology industries) are not significant.

We evaluate the potential effect of colinearity of each regression using the variance-inflator factor (VIF), which is equal to $1/(1 - R^2)$, where R^2 is derived from the regression of an explanatory variable on all other explanatory variables. Heteroskedasticity is corrected by using the White heteroskedasticity-consistent standard error and covariance matrix.

4.1. *Endogeneity issues*

We believe the recommendation issued by the analyst is endogenous in that our measure of intellectual capital disclosure directly affects the analyst decision. Positive recommendations may lead analysts to consider intellectual capital information to justify their decisions and, at the same time, intellectual capital information may lead analysts to issue buy recommendations. In the presence of endogeneity, ordinary-least-squares estimation yields biased and inconsistent coefficient estimates. Following Frankel et al. (2006) we base our main analysis of cross-sectional variation of ADI on a two-stage least squares where we assume that the recommendation variable is endogenous and we treat the rest of our variables as exogenous. In this two-step procedure, the first step is the estimation of a logit regression that predicts the probability of issuing a buy recommendation, and the second-stage (OLS) regression uses estimates from the first stage to provide consistent estimates of the parameters. Although 2SLS requires the identification of exogenous instruments, many of our determinants of ADI are not purely exogenous. Nevertheless, we consider that there are some variables more likely to influence the analyst recommendation than the analyst disclosure on intangibles. The exogenous variables selected in our logit model are Negative earnings and Brokerage house. The selection of these variables is based on previous literature concerning analyst research (e.g., Previs et al., 1994; Breton & Taffler, 1995; Frankel et al., 2006). It may be expected that analysts will make more positive recommendations in firms with positive earnings. Thus, analyst incentives to issue optimistic bias, combined with higher opportunities of generating investment banking and brokerage business in international brokerage houses, lead us to expect that in international houses analysts will have more incentives to issue optimistic decisions.

Table 11
Two stage-least-squares regression

Variable	Buy_1	S.E.	ADI_2	S.E.	VIF
Intercept	0.433	0.524	0.00	0.201	
Neg_Ear	2.1***	0.599	-0.338	0.938	1.519
Pro			8.932**	4.304	1.665
MB			0.332*	0.194	3.022
Firmed (Buy)			-0.167	6.808	1.347
Foot			-1.093	1.001	2.667
L_M			0.388	0.369	2.116
Report			-8.224***	0.759	1.207
Broker_H	0.321	0.317			
A2000	1.964***	0.491	-3.910	2.575	1.876
A2001	0.817**	0.393	-5.117***	1.555	1.723
A2002	0.477	0.407	-4.693***	1.456	2.146
Ind_1	-2.547***	1.079	-4.961	1.452	1.427
Ind_2	-0.887	0.543	-2.792	1.984	2.936
Ind_3	-0.716	0.752	0.409	2.842	1.493
Ind_4	-0.577	0.527	-4.136**	1.666	2.927
Ind_5	-0.044	0.828	-4.146**	2.122	1.377
Ind_6	-1.91**	0.770	-5.119	3.427	1.973
Ind_7	-0.002	0.881	-3.073	2.324	2.314
Ind_8	0.405	0.560	2.486	1.778	4.012
N	255		228		
Adjusted R-squared	0.123		0.620		

Table 11 contains two least squares (2LS) estimation results of the models:

$$\text{Buy} = \alpha_0 + \alpha_1 \text{NegEar}_{it} + \alpha_2 \text{Broker}_H$$

$$+ \sum_{i=1}^8 \alpha_{i+2} \text{Ind}_i + \varepsilon_{it} \quad (1)$$

$$\text{ADI}_{it} = \beta_0 + \beta_1 \text{Intercept} + \beta_2 \text{Pro}_{it} + \beta_3 \text{FirmedBuy}_{it} + \beta_4 \text{Foot}_{it} + \beta_5 \text{Report}_{it} + \beta_6 \text{L}_M + \beta_7 \text{MB}_{it} + \beta_8 \text{MB}_{it-5}$$

$$+ \sum_{i=1}^8 \beta_{i+9} \text{Ind}_i + \varepsilon_{it} \quad (2)$$

where Buy_{it} is a dummy variable that takes a value of one if the firm includes a buy recommendation and zero otherwise; Neg_Ear_{it} is a dummy variable that takes the value of one if there is negative earnings and zero otherwise; Broker_H takes a value of one if an international brokerage house. In the model 2 ADI is the Analyst Disposition Index; Intercept is a dummy variable that takes a value of one if the report is issued for companies and (excluding and otherwise); Pro is the profitability ratio; FirmedBuy_{it} indicates predicted yield provided by Eq. (1); Foot_{it} is a dummy variable that takes a value of one if a result report and zero if it is a research report; L_M is the logarithm of market value at the end of the year; MB_{it} is the market-to-book ratio; MB_{it-5} is the market-to-book ratio for the 2000 year; MB_{it-1} is the market-to-book ratio for the 2001 year; Ind_1 is the dummy variable for Banks and financial firms; Ind_2 is the dummy variable for Chemicals industry; Ind_3 is the dummy variable for Food, Beverage and Tobacco industry; Ind_4 is the dummy variable for Construction industry; Ind_5 is the dummy variable for Metal and engineering; Ind_6 is the dummy variable for Petroleum and industry; Ind_7 is the dummy variable for Pharmaceutical industry; and Ind_8 is the dummy variable for New technology industry; and ε_{it} is the error term.

Source: Authors' estimations using the data provided by the

CRD database (annual reports).

Based on this argument ADI is modeled as the following system of equations:

$$\text{Buy} = \alpha_0 + \alpha_1 \text{NegEar}_{it} + \alpha_2 \text{Broker-H} + Y_t + \sum \text{Ind}_{it} + \varepsilon_{it} \quad (1)$$

$$\text{ADI} = \gamma_0 + \gamma_1 \text{Int_List}_{it} + \gamma_2 \text{Prof}_{it} + \gamma_3 \text{Fitted_Buy}_{it} + \gamma_4 \text{Report}_{it} + \gamma_5 \ln M_{it} + \gamma_6 M/B_{it} + Y_t + \sum \text{Ind}_{it} + \varepsilon_{it} \quad (2)$$

where Buy_{it} is a dummy variable that takes a value of one if the report has a buy recommendation and zero otherwise; Neg_Ear_{it} is a dummy variable that takes the value of one if there is negative earnings and zero otherwise; and Broker_H_{it} takes a value of one if it is an international brokerage house. In model 2, ADI_{it} is the Analyst Disclosure Index, Int_list_{it} is a dummy variable that takes a value of one if the report is issued for an international listing firm and zero otherwise; Prof_{it} is the profitability ratio; Fitted_Buy_{it} indicates predicted value produced by Eq. (1), Report_{it} is a dummy variable that takes a value of one if it is a result report and zero if it is a company report, $\ln M_{it}$ is the logarithm of market value at the end of the year; M/B_{it} is the market-to-book ratio; Y_t represents temporal effects (year dummies); $\sum \text{Ind}_{it}$ represents industry effects (industry dummies), and ε_{it} is the error term.

Model 1 of Table 11 shows the results of the first-stage regression. The pseudo- R^2 is 0.12 and there is evidence of more buy recommendations for those firms with positive earnings. The fitted variable from this equation is then substituted in Eq. (2) to explain cross-sectional variation in ADI. Under the assumption here, the use of the fitted value circumvents the endogeneity problems of estimation. This will help us improve our understanding of the specific role intellectual capital disclosures play in the formation of analyst expectations.

The results of model 2 in Table 11 show that profitability ($p < 0.05$), market-to-book ($p < 0.10$), and type of report ($p < 0.01$) are statistically significant. The results suggest that financial analysts include more intellectual capital information for firms characterized by high profitability and high growth opportunities. After controlling for endogeneity the type of recommendation does not influence the use of intellectual capital information. Construction and metalworking industries are statistically significant and negative ($p < 0.05$), indicating that disclosures about intangibles occur less often in these traditional industries.

All the significant variables explain around 62% of the variability of intellectual capital information in analyst reports.

5. Concluding remarks

To gain some insight into the relevance of intellectual capital information for financial analysts, we examine a sample of analyst reports for the essential items considered most relevant in justifying recommendations. The items most frequently included are related to coherence and credibility of strategy, new investments, and firms' products, alliances, or leadership. It is obviously harder for analysts to obtain data on innovation when

companies do not want to risk releasing information that could be beneficial to competitors.

In controlling for endogeneity, our study provides evidence on why the average magnitude of intellectual capital information in analyst reports is greater for some firms than for others. Some variation in the extent of disclosure of intangibles is explained by the profitability of the firm. Financial analysts have better access to information about a profitable firm's intellectual capital because they acquire other information. This supports agency, signalling, and political-process theories that profitable firms provide superior information resources.

Growth opportunities also explain variations in disclosures on intangibles in analyst reports. Financial statements are relatively less informative for firms with high market-to-book ratios, and here analysts tend to include more intellectual capital information to justify their recommendations. In this case, firms and investors demand more information about the role a company's intangibles play in value-creation.

The results show significant differences in the use of intellectual capital information according to type of report. We are more likely to find data about intangibles in reports that deal with specific strategic issues, such as new products or changes in a firm's strategy, and that are often issued to generate investment banking and brokerage business for their firms. These results would confirm the role of intellectual capital information as a marketing device, if the primary objective of financial analysts is to generate commission income.

We reject the hypothesis that a report on an internationally listed company includes more information on intangibles than a report on a nationally listed company. Nor are there differences by firm risk, firm size, or analyst recommendation.

This research makes a variety of important contributions, particularly quantification of intellectual capital information in analyst reports and identification of factors that influence the use of these data. It extends survey, questionnaire, and interview research to address the relevance of non-financial information.

Financial analysts are both primary users of financial information and key information intermediaries. Their needs must be taken into account when regulators establish accounting policy and set standards. Our work shows that much of the information analyst reports include does not appear in traditional financial statements. Modified reporting standards that specify additional types of information might better meet investor needs and mitigate problems of information asymmetry in capital markets.

Our results have several inherent limitations. We cannot know what information analysts may have relied on but did not report. Neither do we know about information that was unavailable and that might have been useful. Nor can we directly infer analyst information needs from seeing how often an information item is mentioned in reports. We can only assume that analyst reports deliver relevant information efficiently and effectively, and that analysts have no incentive to include extraneous information for any reason. Other items in different categories or distributions might have been considered, which could obviously influence interpretation of the results.

There is no generally accepted theory or classification scheme for intellectual capital. Today's frameworks are *ad hoc*, and empirical work on the nature of intangibles is in its early stages. Our results, nevertheless, suggest several questions for future research. We

know analysts use intellectual capital information. Does access to and provision of intellectual capital information make forecasts more accurate?

Appendix A

Items included in the Analyst Disclosure Index by category

Analyst Disclosure Index	Frequency (%)
<i>Human Capital</i>	
Management experience/abilities	43.46
Change in number of employees	16.54
Agreements with employees	4.62
Breakdown of employees by age or experience	3.85
Experience of employees	3.46
Recruitment policy	3.46
Description of competence development program	2.69
Production/Income per employee	1.54
Remuneration systems	1.15
Education and training policy	0.77
Pensions	0.77
Job rotation opportunities	0.38
Dependence on key employees	0.38
Value added per employee	0.38
Career opportunities	0
Insurance policies	0
<i>Customers</i>	
Customer breakdown by product or business	46.15
Market share by segment/product	43.08
Sales breakdown by product or business	42.31
New customers	38.08
Customer relationships	21.54
Relative market share to competitors	18.08
Sales breakdown by customers	14.62
Market share	9.62
Dependence on key customers	7.31
Value added by customer or business	3.08
Education and training of customers	1.54
Production by customer	1.15
Customers by employee	0.77
<i>Organizational</i>	
Efficiency	42.69
Installed capacity	42.31
Investment in technology	33.08
Business model	31.15
IT systems	25.38
Utilization of energy and other input goods	23.46
Organizational structure	20.38
Information and communication within the firm	13.46

(continued on next page)

Appendix A (continued)

Analyst Disclosure Index	Frequency (%)
<i>Organizational</i>	
Corporatize culture	8.46
Environmental policies	3.46
Litigation	2.69
Efforts related to the working environment	2.31
External and internal failures	0.77
<i>Innovation, research, and development</i>	
Patents and licenses	25.77
Strategy, objects of I and R & D	6.54
I and R&D in basic research	1.15
I and R&D in product design/development	1.15
Future projects regarding I and R&D	0
Patents pending	0
<i>Strategy</i>	
Investment in new business	98.82
Credibility and consistency of strategy	93.46
New products	87.31
Strategic alliances and agreements	70.38
Leadership and trademarks	68.46
Price policy	47.69
Information about marketing	29.23
Network of suppliers and distributors	24.62
Quality of products	20.77
Environmental investments	5
Best practice	2.31
Social responsibility	0.38

This table represents the frequency of use of intellectual capital indicators in the sample of 260 analyst reports during the period 2000–2003. There are 60 items which take a value of one if included in the analyst report and zero otherwise.

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The relevance of International Financial Reporting Standards to a developing country: Evidence from Kazakhstan

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Abstract

International Financial Reporting Standards (IFRS) were developed in advanced economies, but are increasingly being applied in emergent economies, potentially ignoring considerations of whether IFRS are appropriate or relevant to such economies. This case study examines the relevance and implementation of IFRS to the emerging economy of Kazakhstan from independence in 1991 to 2006. It concludes that although a strong case for IFRS relevance cannot be made, even by 2006, Kazakhstan had little choice but to proceed with IFRS, and that IFRS relevance is likely to increase as Kazakh economic development continues. Implementation of IFRS is proving problematic, but is taking place slowly. This, in turn, has implications for the theoretical status of the IFRS relevance argument and the pathways that nations might follow in implementing a national accounting system. If the only choice of accounting system is IFRS, then the IFRS relevance debate is effectively closed and the real issue is the pathway of change that nations might follow as they implement IFRS.

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1. Introduction

The tendency for countries to adopt IFRS¹ has been accelerating in recent years (Deloitte, 2004; Shneidman, 2003). The benefits of this standardizing trend seem widely accepted among practitioners (PwC, 2000; Tweedie, Chairman of the IASB, as quoted in Tricks & Hargreaves, 2004), governments (Bolkestein, European Commissioner, as quoted in Walton, 2004; Commission of the European Communities, 2001; United Nations Secretary General, 1993; USAID, 2004), and academics (Jaruga, 1993; Thorell & Whittington, 1994), including Kazakh sources (Serebrennikova, 2004).

However, there are both advantages and disadvantages to harmonization (Thorell & Whittington, 1994) and these may affect developed and developing countries differently. The International Accounting Standards Committee Foundation has recognized the “need to have an understanding of the impact of IFRS as they are adopted in particular regions” (IASB, 2004, para. 93) as a result of the criticism that the IASB tends to display an “ivory tower” mentality (Parker, 2004), hence paying insufficient regard to the practical impacts of its standards. The present case study evaluates these very issues in relation to the transition from Soviet accounting methods to IFRS in Kazakhstan.

Accounting reform in former USSR countries has been extensively investigated, particularly among the more westerly of the ex-Soviet nations (Bailey, 1995, 1998; Daniel, Suranova, & De Beelde, 2001; Jaruga, 1993; Jaruga & Szychta, 1997; Seal, Sucher, & Zelenka, 1995; Solodchenko & Sucher, 2005; Young, 1999. See Nobes & Parker, 2006, 228ff for overview), perhaps because their geographic proximity to Western Europe and historical backgrounds meant that accounting reforms came more rapidly to these countries. Hence a case study of accounting development in Kazakhstan may form a useful addition to the literature, especially since it is likely that Kazakhstan will have “a critical role to play in global energy security” (U.S. Energy Secretary Samuel Bodman quoted in Kazakhstan Embassy, 2006a), given her vast natural resources of hydrocarbons which are projected to supply 2–3% of the world’s demand for oil within the next decade (Kazakhstan Embassy, 2006b).

The case study proceeds as follows: Section 2 reviews the advantages and disadvantages of IFRS adoption by developing countries. It explicates a four-factor framework for assessing the relevance of IFRS to a particular country, and presents a categorization of pathways that governments may take in selecting and implementing a national accounting system.² The methodology and data sources are presented in Section 3. Section 4 applies the four-factor framework to assess the potential relevance of IFRS to Kazakhstan. Section 5 assesses the progress and problems on the pathway to IFRS implementation. Section 6 discusses the limitations and conclusions in relation to both Kazakhstan and the theoretical framework.

¹ The abbreviation IFRS is used to denote both IFRS and IAS (International Accounting Standards) throughout. Similarly the abbreviation IASB is used to denote both the IASB (International Accounting Standards Board) and its predecessor the IASC (International Accounting Standards Committee).

² Following Nobes (1998, 164), the term “accounting system is (defined as) a set of practices used in an annual (financial) report.”

2. Literature review

“The very idea of classification in international accounting” (Roberts, 1995, 639) is predicated upon the existence of national differences between accounting systems. Differences between national accounting systems may arise from economic and institutional differences (e.g., Mueller, 1967; Nobes, 1983, 1998, 2004) or from cultural differences (often based on Hofstede’s cultural dimensions, e.g., Chanchani & Willett, 2004; Ding, Jeanjean, & Stolowy, 2005; Gray, 1988; Salter & Niswander, 1995) or they may simply have been identified using statistical clustering techniques (e.g., Nair & Frank, 1980; D’Arcy, 2001). If differences between accounting systems exist, it is natural to suggest that this is because accounting needs differ among nations (Briston, 1978; Hove, 1986; Nobes, 1998; Radebaugh, Gray, & Black, 2006). This should lead to the development of nationally specific accounting systems dependent on the specific socioeconomic environment (Bailey, 1998).

On the other hand, globalizing trends, including international economic and political interdependence, increasing foreign direct investment (FDI), developments in MNE strategy, the impact of new technology, the growth of international financial markets, and the influence of international organizations (e.g., IASB, World Bank), are increasingly tending to harmonize national accounting systems (Gray, 1988, 1989; Radebaugh et al., 2006, 52ff). The effects of globalization combined with studies of the development of accounting systems in different countries have led to revised or “modernised” approaches to the classification of international differences in accounting systems which suggest that the degree of freedom to choose, and hence the choices made, between the IFRS and nationally specific accounting systems will differ between “culturally self-sufficient” and “culturally dominated” countries (Nobes, 1998; Nobes & Parker, 2006).³

For culturally self-sufficient countries (e.g., advanced OECD economies), the accounting system chosen will depend on the strength of the national equity market. IFRS or related Anglo-Saxon⁴ accounting systems (e.g., U.K. or U.S. GAAP), based on a micro-economic, shareholder-oriented, judgment-based model of financial reporting, tend to predominate in countries with strong equity markets (Doupnik & Salter, 1995; Jones & Luther, 2005; Nobes, 1998). In culturally dominated (usually developing) countries, the pathway is determined by the source of the cultural influence involved rather than by any indigenous national needs. This might or might not result in inappropriate accounting systems being implemented in culturally dominated countries. For example, the U.K. exported its culture, including language, economic, legal and educational systems, to its colonies, thus bequeathing them (for better or worse) similar institutional environments. As a result, many former U.K. colonies have found IFRS to be largely or partially relevant to

Nobes (1998) suggests that the degree of cultural self-sufficiency be measured by the number of decades since a country gained political independence but gives little guidance on measuring the degree of cultural domination, other than to observe that “researchers should have little difficulty in classifying many countries” (178).

⁴ It is argued that there is a dominating Anglo-Saxon bias within IFRS, arguably due to the superiority of Anglo-Saxon countries in the standard-setting process (Briston, 1978; Chandler, 1992; D’Arcy, 2001; Hove, 1986; Jones & Luther, 2005; Perera, 1989). The nature and extent of any Anglo-Saxon bias within IFRS is not undisputed (Alexander & Archer, 2000; Cairns, 1997; Nobes, 2003), but few dispute that the underlying basis of IFRS is a micro-economic, shareholder-oriented, judgment-based model of financial reporting.

their national needs despite having weak equity markets (Ashraf & Ghani, 2005; Chamisa, 2000; Nobes, 1998, 2003). For other culturally dominated countries with different histories an IFRS-type accounting system has been held to be inappropriate (e.g., Indonesia, see Briston, 1978 or former Soviet countries, see Bailey, 1995), with the suggestion that a macro-economic, rules-based, governmental model with a code-based or uniform accounting system (UAS), such as the French *plan comptable*, could be more relevant to the accounting needs of countries with few listed companies, sophisticated shareholders, or qualified accountants (Briston, 1978), particularly if entities are already accustomed to plan-based accounting (Jaruga, 1993).

Others see the accounting possibilities for all nations narrowing to a single IFRS option. Important differences in economic, political, legal and cultural systems (Chandler, 1992; Kikuya, 2001; Perera, 1989; Radebaugh et al., 2006, 6 and 182) are ignored under a form of “accounting colonialism” backed by the coercive power of international financial capital (Bailey, 1998; Chandler, 1992; Hove, 1986). Accounting policy makers may be constrained in their choices of appropriate accounting systems, but perhaps fears concerning the adoption of inappropriate accounting models are exaggerated (Krzywda, Bailey, & Schroeder, 1995). In a case study of accounting transition in China, Xiao, Weetman, and Sun (2004) suggest that IFRS in tandem with an UAS was a relevant rather than an enforced choice by Chinese accounting policy makers, and conclude that the addition of a third factor, *viz.* political influence, to Nobes’ (1998) other two factors not only restores choice but also adds explanatory power to his model.

Belkaoui (2004, 150–3) expands the possibilities for national political choice beyond the two pathways in Nobes’ (1998) parsimonious model to four standard-setting pathways for nations. Two Belkaoui pathways lead to IFRS, although at differing speeds: (1) the “quick fix” involving the “adoption” of IFRS as national standards, and (2) the slower “transfer of technology” path in which international accounting firms, multinational enterprises (MNEs) and academicians operating in developing countries disseminate international accounting techniques. The other two pathways lead to nationally specific accounting systems: (3) the “situationist” path whereby the developing country adapts accounting techniques from a variety of sources, including developed nations and IFRS, to its specific situation, and (4) the “evolutionary” path whereby a country develops its own standards without reference to outside influence. The pathway selected will depend on the relative advantages and disadvantages of IFRS versus nationally specific accounting systems that may apply at standard setting (Kikuya, 2001), national (Ashraf & Ghani, 2005; Briston, 1978; Chamisa, 2000), and company (Joshi & Ramadhan, 2002; Murphy, 2000) levels.

Advantages to developing nations of harmonizing on IFRS include: the elimination or reduction of set-up costs in developing national accounting standards; the potential for rapid national improvement in the perceived quality and status of financial reports; increases in market efficiency in (inter)national financial markets through the provision of more understandable, comparable, and reliable financial statements; and a reduction in the cost to firms of preparing financial statements (Ashraf & Ghani, 2005; Belkaoui, 2004; Chandler, 1992; Choi & Mueller, 1984; Murphy, 2000; Nobes & Parker, 2006, 76).

Disadvantages of harmonizing on IFRS for developing nations relate to the adoption of a set of accounting standards unsuited or irrelevant to national needs. At firm and national

levels, this may result in “standards overload” (Choi & Mueller, 1984), as firms endeavor to comply with IFRS that exceed their business requirements in complexity (Belkaoui, 2004) and the ability of indigenous accounting staff to operationalize them (Perera, 1989). Increasing harmonization and complexity in accounting standards tends to facilitate expansion of large international accounting firms at the expense of local firms in both developing (Choi & Mueller, 1984; Radebaugh et al., 2006; Salter & Niswander, 1995) and developed (Jopson, 2006) countries.

The problem for a government is how to weigh the relative advantages and disadvantages of these different pathways in order to choose the most appropriate pathway or, putting the question differently, how to assess the relevance of IFRS to national needs. Given that economic, institutional, and cultural bases have been used for the classification of different national accounting systems, it is not surprising that these same bases have been used to make the assessment of IFRS relevance to national needs — so that:

1. the degree of similarity of the developing country’s economic and social environment to that of developed economies, including
2. the relative size of the public and private sectors, and
3. the state of development of the capital market, would determine
4. the accounting needs of the country and the relevance of IFRS to those needs (Briston, 1978; Chamisa, 2000; see also Nobes & Parker, 2006, 24ff; Radebaugh et al., 2006, 15ff).

The Briston (1978) and Chamisa (2000) four factors and the Nobes (1998) and Belkaoui (2004) development pathways are applied to a case study of Kazakhstan’s transition to IFRS in order to assess the extent to which national choice between accounting systems and their associated development pathways was or is being exercised and the appropriateness of any choices made.

3. Methodology

The paper adopts a case study method employing a variety of primary and secondary sources.

Participants in the transition to IFRS were questioned directly via two 1-h one-to-one semi-structured interviews⁵ (Easterby-Smith, Thorpe, & Lowe, 1991) with the Directors of the Accounting Departments in the National Bank and the Ministry of Finance. The rationale for the selection is that these governmental agencies are, as in other former Soviet countries (Alexander & Archer, 1998; Jaruga, 1993; Nobes & Parker, 2006), the main accounting regulators. The National Bank (2004) regulates accounting procedures for financial institutions and the Ministry of Finance regulates accounting for all other enterprises (ADB, 2005a).

A postal survey comprising questions based on Boross, Clarkson, Fraser, and Weetman (1995), Illés, Weetman, Clarkson, and Fraser (1996), and Joshi and Ramadhan (2002), plus the professional experience of the Kazakh researcher, was sent to the 93 companies listed on Kazakhstan Stock Exchange (KASE) in July 2003, with 35 usable responses.

representing a response rate of 43.2%, similar to Chanchani and Willett (2004) and Joshi and Ramadhan (2002).

Secondary documentary sources, including official reports from Kazakh and international agencies, Kazakh Accounting Standards (KAS), published annual reports of Kazakh companies, data presented on the KASE, and Kazakh company websites, were used to provide supplementary data on accounting change in Kazakhstan. Studies of accounting change in other developing and former Soviet countries provide comparative data.

This use of different data sources in a case study enables triangulation not only among different types of data but also among competing interpretations of that data (Yin, 2003).

4. The relevance of IFRS to Kazakhstan

4.1. The similar-environments factor

Before independence, Soviet rule of Kazakhstan was almost total, and the time period since independence is just 15 years, suggesting substantial cultural domination rather than cultural self-sufficiency, and under a regime that was not even indirectly involved in the development of IFRS.

Like other former Soviet countries (see e.g., Alexander & Archer, 1998; Bailey, 1995, 1998; Daniel et al., 2001; Jaruga, 1993; Jaruga & Szychta, 1997; Young, 1999), independent Kazakhstan is a code-law jurisdiction (KPMG, 2004) and its accounting system derives from the Soviet plan/chart-based system used to exercise central control over enterprises' assets and operations in order to monitor the achievement of objectives against the national economic plan (ADB, 2005a). Thus a macro-economic, rules-based, governmental model designed to provide standardized information across industrial sectors was the historic basis for the Kazakh accounting system (ADB, 2002). In the post-Soviet period, as elsewhere in the former Soviet Union (Krzywda et al., 1995), a juridical interpretation of the accounting concepts of assets, liabilities, equity and profit and loss was added to this model in Kazakhstan. Due to these differences Tuleshova (2003) finds substantial obstacles to IFRS implementation in Kazakhstan, suggesting little or no "similar-environments" basis for the relevance of IFRS to the Kazakhstan of the present.

Since independence, the Ministry of Foreign Affairs (1992) has stated that "the... fundamental foreign policy... of Kazakhstan... (is) to integrate into the world community... based on partnership with three principal centers of the market-based system, the USA, Japan and Western Europe." Each of these three centers has now either adopted IFRS or commenced a convergence program with IFRS. Kazakhstan continues to signal its integrative intentions (USAID, 2001a, 2004): e.g., in applying to join the World Trade Organization and to undertake the chairmanship of the Organization for Security and Cooperation in Europe (2006). The business culture of Kazakhstan is becoming more international with increasing business travel, education, and sponsored exchange programs to the United States and United Kingdom (USAID, 2001b, 2004), and a state program to promote the study of English as the language of international affairs and business. Thus, although there may be little evidence of a "similar environment" in Kazakhstan's past, it can be argued that the future environment which Kazakhstan aspires to create provides more support for the relevance of IFRS. However, cultures tend to be

resistant to change, or at least retain traces of earlier cultural features over long periods (Hofstede, 1984, ch. 8; Smirnova, Sokolov, & Emmanuel, 1995), suggesting that the relevance of IFRS to the Kazakhstan environment might increase only slowly.

4.2. *The private-sector factor*

The second factor bearing on IFRS relevance is the comparative size of an economy's private and public sectors, since IFRS are currently aimed at listed private sector rather than public sector entities.⁵ Also, the government has little need of published annual reports as it is in a position to demand information tailored to its specific needs (Nobes, 1998).

During the Soviet period the state controlled 100% of Kazakhstan's economic resources. Since independence, Kazakhstan has undertaken vigorous reform of its economic system, shifting economic activity from the public to the private sector, hence increasing the potential relevance of IFRS to the Kazakh economy. Three major factors were involved in this shift: privatization of thousands of former state enterprises, the creation of new private businesses, and an influx of foreign-owned enterprises (see Table 1).

In Kazakhstan, as in most countries, SMEs represent a large majority of private entities (see Table 1) but their contribution to GDP is relatively small.⁶ Although there is an ongoing but controversial project to adapt IFRS for SME use (IASB, 2005), IFRS are not currently designed for this sector, giving little support for the relevance of IFRS on the basis of the needs of this group.

There are over 1000 large Kazakh private-sector firms but the number is fairly static now that the privatization program has slowed, and the state is still the only or major owner of a significant number of enterprises including large national utilities – e.g., KazMunaiGaz, a national oil and natural gas company formed in February 2002. These state enterprises still account for about one third of GDP (STAT-USA, 2004; World Bank, 2004).

There is also considerable state intervention in and support for privatized firms (World Bank, 2000, 2005). The average Kazakh firm surveyed for the World Bank (2005) earned 23% of its revenues from transactions with the state, and there are high levels of inter-organizational arrears, with the level of arrears being in direct proportion to state ownership in the entity (World Bank, 2000, 2005). In addition, there is considerable government-based credit across the Kazakh economic system. Budget funds provide approximately 12% of firms' investments (Kazakhstan Embassy, 2006a). The government has established lending institutions – e.g., National Oil Fund in 2000, Development Bank in 2001, and the Investment and Innovation Funds in 2003 – because it feels that “the financial system

⁵ Although there is an IEAC project to adapt IFRS appropriately for public sector entities in progress.

⁶ Kazakh SMEs were privatized through voucher schemes issued to 95% of citizens (Library of Congress, 1996). The pace of privatization slowed after an early peak in 1997, when 677 SMEs were privatized to 1825 in 2002 (IMF Country Reports, 2002 and 2003), a pattern common in transitional economies (Jaruga, 1993). Since then there has been a steady increase in the number of private-sector SMEs, mainly engaged in wholesale or retail activities, rising from 87,000 in January 1999 (USAID, 2001a) to the levels shown in Table 1, more or less in line with the annual 10% growth in the Kazakh economy. SMEs account for over 98% of total registered enterprises in Kazakhstan and together with peasant farms represent 25–30% of total national employment.

Table 1
Number of business entities

Period	01/01 2002				01/01 2006			
Sector	Total	Public	Private	Foreign	Total	Public	Private	Foreign
Small	143,442	16,972	121,535	4935	213,347	19,632	183,160	10,555
Medium	10,908	6342	4488	78	11,512	7014	4313	185
Large	2070	859	1173	38	2049	825	1169	55
Total	156,420	24,173	127,196	5051	226,908	27,471	188,642	10,795

Source: Kazakhstan, Statistical Agency, 2006.

Note: Small < 50; medium = 51–250; large > 250 employees.

cannot ensure long-term and low-interest loans to the economy in view of significant risks” (Kazakhstan Embassy, 2006a).

The size of both national company sector and private sector reliance on government funding is decreasing as continuing privatization shifts economic activity towards the private sector and large firms grow in importance, but it is arguable that the private sector factor supporting IFRS relevance is likely to grow only slowly. Hence, the current sources of funding for large Kazakh firms (i.e., the capital-market factor) may be a more immediate influence upon IFRS relevance in Kazakhstan.

4.3. *The capital-market factor*

In most economies, firms rely considerably upon internally generated funds for their investment requirements, but it is the source of external funding that determines IFRS relevance in the Nobes (1998) model. Lending institutions typically negotiate additional access to financial information from borrowers and so, like governments, place less reliance on equity-oriented published financial statements (Nobes, 1998).

Kazakh firms generate approximately 80% of funding internally, but their main source of external funding is the Kazakh banking sector (National Bank, 2004; STAT-USA, 2004). The continuing predominance of bank-based finance in Kazakhstan weakens the capital markets argument for IFRS at present. Thus the relevance of IFRS is limited to firms with listings on KASE or other financial markets.

KASE has been slow to develop since its founding in 1993. By 2003–6 it listed approximately 100 companies, i.e., only 10% of the large, private-sector Kazakh firms. Trading volumes in corporate securities are low at approximately 1% of GDP per annum (KASE, 2003; World Bank, 2006a). Most transactions occur over the counter and only a few popular Kazakh shares trade regularly so that the market lacks depth (ADB, 2003;

⁷ For the banking sector, the loan portfolio to GDP ratio was 33% as of 1 January 2005, while the equivalent ratio for the bond market was 12%, and the market capitalization of the equity market was 9% (FSA, 2005). It is arguable that these figures understate the significance of bank finance since banks and financial institutions are among the largest enterprises listed on KASE. In September (March) 2006, financial institutions represented approximately 48% (43%) of KASE bond issues by number and 89% (89%) by value, and 32% (32%) of KASE equity issues by number and 60% (59%) by value. All KASE percentages calculated from information provided on the KASE website, <http://www.kase.kz/eng/Emitters/>, in March and September 2006.

KPMG, 2004).⁵ KASE (2003, 8, sic) candidly admits that Kazakhstan “still did not have the developed stock market and we can only hope that it will appear in the future. (The corporate securities market) stays narrow, it isn’t marketable enough and the prices developing in this market still reflects neither the economic development of the republic nor separate sectors of its economy.” KASE reiterates these views in its 2004 report (10), the most recent available as of September 2006.

Given the current stage of development of KASE, it seems difficult to argue for the current relevance of IFRS on the basis of the capital-markets factor. Cairns (1997) offers a counter-argument using the Japanese concept of *nemawashi* (groundwork), meaning that it is vital to prepare the ground carefully before planting a tree, a point which is especially relevant when it is remembered that this kind of economic transition is acknowledged and been found to be a long process (Jaruga, 1993). For example, it is argued that inadequate financial records prevent many companies from being listed on KASE (ADB, 2003; STAT-USA, 2004), so that a move to more rigorous accounting standards might entice firms to improve their record keeping, promoting the very market they are designed to serve.

4.4. The accounting-needs factor

On the basis of the first three factors, it seems plausible to suggest that now, 15 years after Kazakhstan began shifting away from a planned economy towards a market-based model, the arguments for the relevance of IFRS are still much stronger with respect to the future Kazakh economy than they are to the present Kazakh economy. One might wonder how long it will be before IFRS would be deemed relevant to Kazakhstan on the basis of these factors — at least in the short or medium terms. Perhaps a code-based system might be more relevant to the accounting needs of a country with an environment quite dissimilar to that of the countries where IFRS were developed, with few listed companies, a weak equity market, and particularly an economy where entities are already accustomed to plan-based accounting (Briston, 1978; Jaruga, 1993).

Against that, accounting reform was not undertaken as a stand-alone exercise, but in tandem with economic reforms in the banking, pension, insurance, tax, and legal systems (USAID, 2004). The former Soviet approach to financial reporting, under which accountability against budget allocations had been the prime requirement, is giving way to a different perspective on the purpose of financial reports, and IFRS clearly provide an appropriate framework to suit this new mandate. However, there was another contributory factor — foreign investment.

⁵ These problems are largely a result of the way in which the privatization of large enterprises was handled. Although a voucher scheme was used, there was a focused distribution of vouchers to only 170 government-licensed investment funds, with 39 funds accumulating 80% of the vouchers, 46 funds 16%, and 85 only 4% (Library of Congress, 1996). One fund, Butra-Kapital, received 10% of vouchers and was widely rumoured to be controlled by a nephew of President Nazarbayev (Library of Congress, 1996). President Nazarbayev’s immediate family and circle of associates still own many of the larger companies (Fidler and Chung, 2006). The existence of “substantial cross-relationships between financial institutions and industrial groups often under complex ownership structures” (IMF, Country Report No. 05/240, 2005), together with government and family involvement, suggest possibilities of financial impropriety (Fidler and Chung, 2006) that deter new investors (ADB, 2005a;), although the IMF (2004b, p. 19) suggests that the problem is receding in Kazakhstan.

Since 1993, Kazakhstan has attracted approximately US\$30bn of FDI from MNEs (Kazakhstan Embassy, 2006c) leading to an increasing number of foreign-owned firms (see Table 1). As in other former Soviet countries (Illés et al., 1996), MNEs brought an influx of Western accountants and auditors importing IFRS or other Anglo-Saxon GAAP in a Belkaoui (2004) “transfer of technology.” In addition, a small number of large Kazakh firms⁹ have listed on foreign exchanges (ADB, 2005a; STAT-USA, 2004). The suppliers of funds and the ratings agencies would presumably have been prepared to accept any internationally recognized accounting standards from these firms, but in practice they have requested or been offered IFRS financial reports.

At the same time, the Kazakh Government applied for financial and technical aid from international institutions, including the Asian Development Bank, EBRD, IMF, OECD, USAID, and the World Bank, e.g., the World Bank (2006b) has provided 24 project loans totalling almost US\$2bn to date. As with other countries (see e.g., Ashraf & Ghani, 2005; Briston, 1978; Chamisa, 2000; Chandler, 1992; Illés et al., 1996; Jaruga, 1993; Solodchenko & Sucher, 2005; Young, 1999), this financial aid was conditional upon Kazakh acceptance of IFRS-based accounting standards, International Auditing Standards (ISA), and internationally recognized audit firms.¹⁰

It could be argued that a Soviet code-based system of accounting might be more relevant than IFRS to project sponsors for reassuring them about the stewardship of their funds. Stewardship was the focus of the former Soviet accounting system (Briston, 1978), and Kazakh accountants were well trained to operate it (ADB, 2002), while it is arguable the stewardship function is a secondary consideration under IFRS. On the other hand, international aid agencies would probably prefer recognizable and standardized reports across all the international projects they sponsor, and IFRS would be an obvious choice in this regard.

Clearly IFRS relevance is high for entities with international funding as it may relieve them of the need to prepare either two sets of financial statements or a reconciliation statement. However, the specific IFRS needs of such entities do not necessarily justify the extension of IFRS to other large, Kazakh private-sector firms. Governments can allow, and have allowed, internationally listed firms to report under different accounting standards to domestic listed or non-listed firms (Nobes, 1998). Entities with international funding could simply be permitted to use IFRS without the need to impose IFRS on other Kazakh firms where it may be less relevant.

However, international institutional pressure for the use of IFRS was not restricted to the financial reporting of sponsored projects. Almost all these international institutions fund programs to promote the use of IFRS more widely in Kazakhstan (USAID, 2006) or undertake regular monitoring of IFRS progress in Kazakhstan (World Bank and IMF, see

⁹ E.g., in late 2005, KazakhMys and KazakhGold listed on the London Stock Exchange, and in October 2006, KazMunaiGaz was in the process of an initial public offering (IPO) valued at approximately \$2bn, floating 20% of a stake in a subsidiary KMG Export and Development, on the Kazakhstan Stock Exchange (KASE) and another 20% on the London Stock Exchange (Chung, 2006).

¹⁰ For example, World Bank loans in relation to the Uzen oil field (1996, Report No. 15114-KZ), the Kazakhstan electricity grid (1999, US\$140m, Report No. 19620-KZ), the Syr Darya and Northern Aral Sea (2001, \$65m, Report No. 22190-KZ), the Nura River (2003, US\$40m, Report No. 25716-KZ), the North–South electricity transmission project (2005, US\$100m) and an EBRD loan in the oil sector (2003, US\$7m, Project No. 34479) all either specify that IFRS and ISA are to be used in relation to these projects or note that the relevant entities are already compliant with these standards.

IMF, 1999, 2004b) or do both (ADB, 2003). For example, USAID assisted in the formation of Kazakhstan's Chamber of Auditors in 1993, its Chamber of Professional Accountants in 2000, and the International Council of Certified Accountants and Auditors (representing accounting associations across Central Asia) in 2001.

4.5. Summary

The four-factor analysis tends to suggest that the need for IFRS was an accounting need in relation to international investors, but that this accounting need could have been satisfied by the implementation of IFRS in a limited number of relevant entities. There is less support for the current relevance of IFRS to the wider range of Kazakh firms and investors, although a stronger, developmental, mode of argument in respect to all four factors could be made for the relevance of IFRS in Kazakhstan in the future as both the private sector and the private capital market expand.

Despite this, the government decided very early on in favour of IFRS rather than a nationally specific accounting system. The first Accounting Laws (1992, 1995) approved the development of KAS and a new Chart of Accounts on the basis of IFRS. Given the preceding analysis it might be expected that the transition to IFRS would prove problematic and this, indeed, turned out to be the case as the next section will show.

5. The advantages and disadvantages of and progress towards IFRS

5.1. Advantages of IFRS

When asked to specify the advantages of IFRS to Kazakhstan, the interviewees at the National Bank and the Ministry of Finance identified similar points to those found in the relevant accounting research:

- there was no reason for Kazakhstan to independently develop what has already been developed elsewhere in the world.
- IFRS would provide greater transparency in financial statements, which should attract increased FDI. Indeed, the largest Kazakh commercial banks have raised money via international borrowings, and applied for ratings to international agencies such as Moody's and Standard and Poor's. These successes required financial statements prepared in accordance with IFRS.
- the adoption of IFRS (i.e., rather than KAS) would significantly ease financial reporting requirements for international corporations investing in Kazakhstan. Some companies with foreign listings had to produce financial statements in accordance with KAS, IFRS and even other sets of accounting standards.
- it would facilitate the quotation of Kazakh company shares on foreign stock exchanges.

However, they also pointed out that:

- the World Bank insisted upon the adoption of IFRS as a condition for the granting of financial aid to Kazakhstan, and that

○ the adoption of IFRS will prove an advantage when joining the World Trade Organization.

It can be seen not only that the major advantages identified largely relate to the investment of international capital in Kazakhstan, overlooking more purely domestic considerations, but also that the interviewees perceived them as “compulsory” IFRS adoption factors.

Asked about disadvantages of IFRS, the two interviewees again identified a number of items including: perceived gaps in IFRS, the requirement for judgment in applying IFRS, lack of national language translations of IFRS, and a number of specific problems and costs of implementation of IFRS.

5.2. Perceived gaps in IFRS

Under the responsibility of the Ministry of Finance, consultants from PwC¹ were engaged in the development of KAS. The interviewees argued that IFRS do not cover all the accounting issues faced in Kazakhstan and pointed to eight Kazakh standards that filled these gaps.¹¹ It is arguable that the interviewees overestimated the extent to which KAS fills gaps in IFRS. Most KAS cover issues already covered by IFRS, and tend to follow their IFRS equivalents (KPMG, 2004), but in English translation KAS extend to only 209 pages (EY, 2004b) compared with 2000+ pages of IFRS. Each KAS is much shorter, with less detail and guidance on application than its IFRS equivalent, suggesting that KAS have more rather than less gaps than IFRS do. Furthermore, a number of issues covered by IFRS, e.g., IAS 29, 32, 39 and 36 have no KAS equivalents, and therefore represent gaps in KAS.

The eight KAS specifically nominated by interviewees as “gap-fillers” all relate to important sectors in the Kazakh economy. However, six of these gap-fillers are short, averaging a mere seven pages each, and tend to be more concerned with disclosure than with recognition or measurement. Thus there are gaps within the gap-fillers. The more substantial gap-fillers are KAS 23 and 24 which prescribe the entire record-keeping format and methodology for a small business. As Deloitte (2005, 9) somewhat wryly point out: “foreigners are sometimes surprised by the requirement(s) (of KAS 23 and 24)”, which are in marked contrast to any of the proposed approaches to an IFRS for SMEs (IASB, 2005).

None of the survey respondents agreed with the interviewees that there was a problem with gaps in IFRS (Appendix, Questions 5–8). Rather, firms felt that an advantage of IFRS was the provision of more standards dealing with specific accounting issues. Perhaps the coverage of KAS does more to support the interviewees’ opposing contention that

¹ These were KAS 16, 19, 20, 23–26 and 32. The Ministry of Finance felt that IAS 26 Accounting and Reporting by Retirement Benefit Plans was inappropriate for the Kazakh pension system and developed KAS 16, 19 and 25 relating to pension funds. The National Bank, having taken advice from international accounting firms and international and domestic insurance companies, developed a standard for insurance companies (KAS 32) based on the world’s best practice before IFRS 4 on Insurance Contracts was issued (March 2004). Similarly there were no IFRS equivalents to KAS 20 Accounting and Reporting for Oil and Gas Extraction Activities, KAS 23 Accounting and Reporting of Small Business, KAS 24 Organization of the Accounting Service, or KAS 26 Accounting and Reporting of Broker and Dealer Organizations.

Kazakhstan, like many other developing countries (Bloom, Fuglister, & Myring, 1998), did not possess the accounting heritage or practical experience to develop complex market-based accounting standards.

However, there was a different kind of gap to be filled which the KAS style of standard could and did fill for a period – the gap between the Soviet economic and accounting model and the new market-based model. As other transition countries found (see e.g., Ashraf & Ghani, 2005; Bailey, 1995; Seal et al., 1995), gaps appeared in Kazakh business compliance with basic legal and tax requirements and in expertise among staff who have to implement regulations (ADB, 2005a; USAID, 2001b). Differences between Kazakh tax codes and IFRS principles increased the opportunities and incentives for “financial irregularities, improprieties, and illegalities in the... enterprise and financial sectors” (ADB, 2005a, 9; IMF, 2004b, 43). Particular problem areas were depreciation accounting, pension liabilities, and valuation of forex items. Differences between financial and tax reporting are common in developed countries (ADB, 2005a; Nobes, 1998), but were new to both accountants and tax collectors in Kazakhstan. They are now gradually being resolved by changes to the Tax Code: e.g., in the acceptance of accrual accounting (Article 65) and finance leasing (Article 74) (FY, 2004a). But as in other former Soviet countries (see Alexander & Archer, 1998), a “quick fix” to full IFRS was not feasible. Instead, the more nationally specific KAS version was developed. KAS were shorter, easier to operate with undertrained staff, under the control of the Ministry of Finance in order to preserve tax and regulatory bases, but still introduced the basic principles of IFRS in preparation for full IFRS later.

5.3. The requirement for judgment in applying IFRS

As the shift to full IFRS approached, survey respondents tended to blame Kazakh regulatory bodies for a lack of proper instructions in the implementation of IFRS (Appendix, Questions 5–8). The interviewees were aware of these IFRS implementation problems which they saw as arising from a culture or “way of thinking”¹² rooted in traditional Asian obedience to elders and the experience of a 75-year history of a centrally planned economy with strict directives on accounting. This is reflected in an unwillingness to take judgment-based accounting decisions, yet IFRS call explicitly for the application of professional judgment in applying principles to the preparation and audit of financial statements (Cairns, 1995, 6). Other ex-Soviet nations have experienced similar difficulties in making this transition between rule-based and judgment-based accounting, and found it to take a long time (Kosmala-MacLulich, 2003).

Although IFRS are principles judgment based, in many cases they are acknowledged to be complex standards. Indeed the complexities of IAS 32–39 have provoked widespread calls in Western European economies for application guidance, so it is not surprising that Kazakh preparers feel a similar need. The ADB (2005b) recognized that the Kazakh’s need for detailed guidance could only be met by the Ministry of Finance, and has been training staff in the Department of Accounting and Audit Methodology (DAAM) of the Ministry of

¹² The original word used by the interviewee is “*menita titeri*”. As the root word of this is “*mental*” it has been interpreted as “*mentality*” or “*way of thinking*.”

Finance in IFRS and assisting DAAM with the publication of methodological recommendations on individual IFRS. Similarly, in the financial sector, the National Bank (2004) and FSA have provided detailed guidance including standardized financial reporting forms and guidelines on the application of IFRS to issues such as the recording of documentary letters of credit and general provisions.

Some survey respondents perceived incompatibilities between IFRS and current Kazakh legislation (Appendix, Questions 5–8). For example, the current Kazakh Chart of Accounts (EY, 2004c) does not provide all the account codes needed for the application of IFRS. No codes are provided for financial assets/liabilities, finance costs, or impairment. This raises problems because of the procedural approach to accounting taken by many Kazakh practitioners: e.g., a Kazakh practitioner asked to account for a fixed-asset impairment might naturally wonder how the accounting entry should be made — i.e., what code to use. The ADB (2005a) with USAID have been pressing DAAM to develop a new IFRS chart of accounts and IFRS conversion manuals, pointing out that “(w)ithout concrete guidance on charts of accounts, enterprise accountants will be very unlikely to fully adopt IFRS” (ADB, 2005b, 5).

5.4. National language translations of IFRS

The IASB provides IFRS in English. This causes a problem of national language translations, with approximately 30% of IFRS-converging countries reporting it as an issue (Deloitte, 2003). Interviewees, international agencies, and survey respondents (Appendix, Questions 5–8) concurred that the lack of Russian and Kazakh translations of IFRS and ISA has caused problems. An official Kazakh translation of “bare numbered” IFRS (i.e., without the accompanying application guidance provided by the IASB) is being prepared by the Kazakh government (per IASB website, October 2006), but the government did not wish to delay the adoption of IFRS until this is ready. The extent of the Kazakh language problem may be exaggerated. Although over half of the population speak Kazakh, even more speak Russian which is used as the primary business and official language (CIA, 2006; Kazakhstan Embassy, 2006c). The lack of an official Russian translation of IFRS (per IASB website, October 2006) is more problematic. Most accountants use unofficial Russian translations of IFRS. The Ministry of Finance is already issuing its methodological recommendations in Russian. A related issue is the need to develop a new accounting terminology to cover accounting concepts not needed during the Soviet era in order to make translation possible.¹³ The EU has been providing technical assistance in developing an IFRS glossary (ADB, 2005a, 13).

5.5. Specific problems and costs of IFRS implementation

The interviewees and a majority of survey respondents (54%) felt that transfer to IFRS is a costly process (Appendix, Questions 5–8). The survey respondents who did not consider the process to be costly (40%) viewed the costs as necessary to promote positive future outcomes. Interviewees, survey respondents, and international agencies all pointed to

¹³ We are grateful to an anonymous referee for pointing this out.

similar types of costs and problems associated with IFRS transition: e.g., training of personnel, changes in software systems, purchase of new accounting literature, the need for consulting services, etc.

Most (74%) surveyed companies indicated a need for IFRS training at all levels, i.e., not only for accounting employees but also for managers, etc. (Appendix, Questions 5–8). Training was recognized early on as an issue in transitional economies (United Nations Secretary General, 1993) and experienced as a difficult and lengthy process in many countries due to such problems as a lack of qualified teachers and suitable textbooks (see e.g., Ashraf & Ghani, 2005; Bailey, 1995; Deloitte, 2003; Solodchenko & Sucher, 2005). Kazakhstan was similarly ill-equipped to implement a Belkaoui (2004) transfer of technology using indigenous academicians. As a result, most practicing Kazakh accountants learned IFRS through self-study, although hampered by a shortage of IFRS textbooks (ADB, 2005a; USAID, 2001b). More recently, increasing training provision has begun to offset these problems. USAID sponsored a public accountancy training program which had trained 759 Certified Accounting Practitioners by 2004 (USAID, 2004). These numbers are steadily increasing (USAID, 2006) as training and monitoring programs extend into firm and governmental organizations (CARANA, 2006).

In general, IFRS require increased disclosure over KAS, e.g., on segmental reporting, consolidation, and financial instruments (Deloitte, 2005). Some respondents (5%) (Appendix, Questions 5–8) have found that their IT systems are not collecting the required information. The data are often available somewhere in the organization but are not properly controlled or cannot be quickly produced. For example, most of the large extractive companies are using Russian-developed accounting software, which is satisfactory for transaction recording and the collection of basic information, but does not provide any analysis or data for detailed disclosures or control, e.g., aged analysis of accounts receivable, inventory movements, maturity analysis, etc. Kazakh accountants will need to work with IT specialists to specify and supervise software amendments to produce the required information, but both depend on DAAM to produce the required account codes. The National Bank (2004, p. 58–59) has intervened directly to improve the automation of accounting at second-tier banks, insurance organizations and pension funds, e.g., in the Housing Construction Savings Bank of Kazakhstan JSC.

Most survey respondents prepared their financial statements under KAS or an IFRS-KAS mixture because their computer systems were not fully IFRS-compatible. Their financial statements were then transformed to IFRS usually by consulting services or Big Four auditors (Appendix, Questions 3, 9, and 11) who used “transformation matrices” (IMF, 2004b, 7) to prepare the IFRS statements required by the National Bank and the FSA. All survey respondents had an independent audit (Appendix, Question 10), mostly by Big Four auditors. Only “B” listed respondents (14%) used Kazakh consulting firms. Preference for a Big Four audit is widespread in former Soviet countries, driven by the desire to enhance the credibility of the financial statements with foreign investors (Joshi & Ramadhan, 2002; Sucher & Zelenka, 1998).

Publicly available IFRS reports display remarkable similarities in format, layout, and wording. This tendency is especially marked when the firms in question share the same auditor, but similarities can also be observed even when the firms in question use different auditors. The IFRS reports for financial years 2001–5 of three different first-tier banks, all

with the same Big Four auditor, show extensive use of identical wording. For example, they all claim in respect of their “Allowance for Impairment of Financial Assets” that “(t)he allowance is based on the Group’s own loss experience and management’s judgement as to the level of losses...”¹⁴ This level of coincidence might be explained by the common use of standard FSA forms, or by auditors providing clients with model reports for them to adapt, and has been observed elsewhere in Western Europe,¹⁵ and in Russia (Nobes & Parker, 2006, 234). Nevertheless, one might still wonder what extent and level of understanding of IFRS exist, who actually prepared these estimates, how independent the audit opinions are, and finally how much credibility is being added by all this. It seems quite possible that the auditors have not only transformed KAS financial statements, a procedure which itself may be questionable, but then prepared and audited the IFRS statements, a combination that elsewhere might be considered a violation of auditor independence (e.g., see Sarbanes-Oxley restrictions on non-audit services). It is suggested that more recently the larger Kazakh banks have shifted to preparing IFRS statements themselves (IMF, 2004a), although the statements may still not be fully consistent with IFRS (IMF, 2004b). Certainly, the banks assert that their more recent (i.e., 2005/6) statements are prepared in accordance with IFRS and unlike the earlier (2003/4) statements they make no reference to “Kazakh accounting and tax regulations.” The more recent statements also show more differences and fewer similarities than the earlier statements did, so the situation may be gradually improving. In both the banks’ and auditors’ defence, it should be noted on the specific issue of the impairment of financial assets that the marking-to-market of financial assets may not be very meaningful in an illiquid capital market (IMF, 2004b, 43), while on the more general issue of similarities of presentation, it is probably a more efficient allocation of scarce IFRS-qualified staff to have them concentrated in the Big Four offices where their services can be shared among Kazakh firms.

Given that the implementation and quality of IFRS reports and audits seem lagging, it is not surprising that the supply is too.¹⁶ Predictably large companies do better than smaller companies and financial institutions do better than non-financial entities, but even with large companies the picture is mixed. For example, KazMunaiGaz, while in the process of a London IPO valued at approximately \$1bn, appeared to provide no financial reports on its website in September 2006, while KazakhMys provided 2005 annual reports and 2006 interims. In the United Kingdom by contrast, almost all listed companies provide a website with an “investor relations” page giving access to annual and interim reports. Although

¹⁴ See ATF Bank 2001/2 signed 24 March 2003 and 2004/5 signed 24 March 2006, Halyk Bank 2001/2 signed 25 March 2003 and 2003/4/5 signed 24 March 2006, Bank TuranAlem 2001/2/3 signed 1 February 2004 and 2002/3/4 signed 23 February 2005 (all audited by E.Y.). Similarly Deloitte and Touche audited statements for three other first-tier banks (Alliance Bank 2003/4/5 signed 21 February 2006, Kazkommertsbank 2004/5 signed 3 February 2006, Temir Bank 2004/5 signed 15 March 2006) show extended passages of identical wording, including the sections on “Allowance for Impairment Losses.”

¹⁵ We are grateful to the participants at the 2006 Open University “Accounting in Europe” Conference for these suggestions.

¹⁶ In March (September) 2006, surveys of the KASE website revealed that while almost all Kazakh issuers supplied KASE with some information about their activities, only about 45% (50%) provided working hyperlinks to their company websites, 30% (40%) provided English translation on their websites and 20% (20%) provided financial statements in English. In the March 2006 survey, the available annual reports tended to relate to 2003 as the most recent financial year. By September 2006, most of the available reports related to 2005/2006.

there is some evidence of improvement in information provision over the period of March–September 2006, these findings could be construed as a criticism of Kazakh companies, but a more realistic suggestion, in line with other research on Internet usage by companies (Fry, Tyrrell, Pugh, & Wyld, 2004), would be that Kazakh companies are reacting rationally to limited demand for information, confirming the Asian Development Bank's view that market pressure on noncompliant companies is mostly absent as the market is small (ADB, 2003).

This lack of pressure is reflected in the relatively low percentage of survey respondents who perceived shareholders as the main users of financial statement information (Appendix, Question 1), in line with experience in other former Soviet economies (Boross et al., 1995). This contrasts with the response one might expect from listed companies in a developed economy, thus indicating that a shareholder orientation is still developing in Kazakhstan. This interpretation is reinforced by the fact that the commercial banks were revealed as the second most significant user of financial statements. However, the number of companies offering regulatory bodies, e.g., the National Bank, Government or KASE, as main users was much lower.

5.6. Summary

As far as the interviewees were concerned the main advantages of IFRS adoption related to access to international funding rather than an improved accounting system. Survey respondents saw more advantages to IFRS than KAS, but all sources seem to agree that the disadvantages relate to the difficulties inherent in transition, rather than any loss of national specificity in the accounting system.

Given the problems of IFRS implementation just described, it is not surprising that the shift to full IFRS has suffered delays at the organizational level. Most (80%) firms surveyed were not early adopters of IFRS and many have lagging implementation of IFRS (Appendix, Questions 2, 3, and 14 and ADB, 2003). In Kazakhstan, as in the EU (PwC, 2003, 2004), larger companies are further ahead than smaller companies and the financial services sector is ahead of other sectors, and as elsewhere in former Soviet countries (Bailey, 1995), enterprises trading with Western economies are ahead of those that do not. Unsurprisingly, the Government has postponed the IFRS deadlines several times. New Accounting Laws of (2002, 2003) required financial institutions to adopt IFRS from January 2003, and other enterprises from January 2004, but these target dates were shifted several times resulting in a phased introduction with the leading banks first in 2003, followed by second-tier banks in 2004, then joint stock companies in 2005 and all other companies, including SMEs, in 2006. Financial reporting under IFRS is developing in Kazakhstan but, in the absence of a virtuous circle in which active investors receive high quality financial reports, the pace is slow, and is likely to remain slow.

6. Discussion, limitations and conclusion

Whilst the dangers of applying the results of a single case study to a larger population are readily recognized, similarities between the Kazakh case study and experience in other developing and former Soviet countries suggest that Kazakhstan is not unique, so that the

results may have wider significance. The conclusions of the four-factor model of IFRS relevance to the Kazakh case are summarized under the appropriate headings below.

6.1. Similar-environments factor

Culturally dominated Soviet Kazakhstan was very different from the culturally self-sufficient Anglo-Saxon nations that developed IFRS, producing two quite different accounting systems with different underlying assumptions. The effect of these differences continues 15 years after Kazakhstan's independence, providing little or no justification for the relevance of IFRS on the basis of a similar environment. In the transition to IFRS, these differences have manifested themselves as difficulties with language and terminology, inhibitions in the use of judgment in applying accounting principles, and a demand for government-provided accounting procedures and codes. Accounting change is likely to proceed slowly, which is perhaps unsurprising given the widely accepted persistence of culture.

6.2. Private-sector and capital-market factors

The private sector is developing in Kazakhstan, especially in the case of SMEs and foreign-owned firms, but there is still substantial governmental, bank, and familial interest in private firms. Equity investors are the *raison d'être* for IFRS, but the equity market is weak, creating little demand for and supply of high quality audited financial statements. Enforcement of high quality IFRS might promote equity market development, but while the market is insufficiently developed, enforcement must come from the government.

6.3. Accounting-needs factor

The first three factors provide little support for the current relevance and only weak support for the future relevance of IFRS to Kazakhstan. The needs of foreign-owned or foreign-listed firms and international aid agencies could be met by permitting them to use IFRS, without any obvious need to impose IFRS on other firms, for which IFRS are less relevant. However, international agencies have been promoting the widespread use of IFRS within Kazakhstan, and the government is implementing it. On the basis of the Nobes (1998) model this seems a curious result — given a weak equity market, and a non-Anglo-Saxon culture, the model would appear to predict the choice of a nationally specific Kazakh accounting system, rather than IFRS, and yet Kazakhstan, like many other ex-Soviet nations has “chosen” IFRS.

One solution to the conundrum is to interpret the outcome as evidence of accounting colonialism imposed by the coercive power of international capital (Briston, 1978; Bailey, 1998; Chandler, 1992; Hove, 1986). The accounting system was enforced by investment need, not accounting need, and the Belkaoui (2004) evolutionary pathway, whereby Kazakhstan developed its standards without reference to outside influence, was not an option. An alternative interpretation is that the newly independent Kazakhstan, like other emerging economies, took a political decision to reject the evolutionary path and follow Western models of economic management. IFRS were not imposed via accounting

colonialism, but were merely the price of integration, or a by-product of other decisions, or even a desirable part of an overall change package. Whatever the interpretation of this outcome, it seems that the Nobes (1998) model is no longer sufficiently parsimonious. Now “All Roads Lead to IFRS.” Thus the scope for political choice identified by Xiao et al. (2004) does not lie among competing accounting systems, and so does not add to the choices in the Nobes (1998) model, but is rather a choice of pathway to IFRS.

In Kazakhstan, the Belkaoui (2004) adoption (quick fix) pathway to IFRS was rejected as impossible. Given its history and environment, Kazakhstan could not and did not shift to IFRS directly. Only the transfer of technology or situationist pathways were realistic options. The government decision to develop KAS and a Chart of Accounts under the Ministry of Finance looks like a situationist pathway, while the use of consultants from PwC lends a transfer of technology “flavour.” The MNEs took a transfer of technology pathway, introducing a variety of Western accountants and accounting standards, e.g., IFRS or other Anglo-Saxon GAAP, to Kazakhstan. Now Kazakhstan is shifting to IFRS plus an accounting code (compare China in Xiao et al., 2004). This result suggests that the transfer of technology and situationist pathways may not be readily distinguishable, and taken together simply constitute a “slow road to IFRS.” This makes it possible that Krzywda et al. (1995) are correct to suggest that the dangers of inappropriate accounting models are exaggerated, because the transition process is likely to be a long one and governments will perforce seek nationally specific pathways of transition.

Future research could investigate the extent to which the adoption and evolutionary strategies are possible or chosen, and the extent to which the situationist and transfer of technology pathways may be differentiated with a view to reworking the Belkaoui (2004) categorization.

If the slow road to IFRS was the only option, what of the disadvantages and advantages of IFRS? FDI is the most obvious gain. The reduction in the set-up costs for accounting standards suggested by the interviewees may be illusory. Kazakhstan had to develop KAS, but this was not done *ex nihilo*, and has alleviated the problem of standards overload, although the process of moving to full IFRS will be a long one. International audit firms have certainly benefited more than local firms from the complexity of IFRS. Financial markets have yet to benefit from more understandable, reliable and comparable reports. To caricature the situation: if original accounting data, including governmental arrears and revaluations derived from illiquid markets, have been processed under KAS through a code-based system with missing codes, transformed by consultants using a matrix based upon an unofficial language translation of IFRS, and finally copy-pasted into a set of ready-made documents which even include the audit report, then it is somewhat unclear what economic meaning or sensible decisions may be drawn from the “information” provided. More seriously, it would be reasonable to suggest that investors approach these reports with at least some caution.

Thus, although there may be apparent *de jure* harmonization of Kazakhstan with other countries adopting IFRS, real differences in the *de facto* application of IFRS and hence in the interpretation of the resulting financial statements may remain for long periods due to differing stages of transition to IFRS. Such differences might linger for long periods if differing procedures are used for IFRS accounting (e.g., whether charts of accounts are controlled at company level or handed down as UAS by governments), thus opening new avenues for classificatory research.

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Appendix A

Section 1: Interview Protocols

One-hour semi-structured (Easterby-Smith et al., 1991) interviews were conducted by the Kazakh researcher with the Directors of the Accounting Departments in the National Bank (NBRK) and the Ministry of Finance (MFRK). The rationale for the selection is that these governmental agencies are, as in other former Soviet countries (Alexander & Archer, 1998; Jaruga, 1993), the main accounting regulators. The National Bank (2004) regulates accounting procedures for financial institutions (including commercial banks, pension funds and insurance companies) and the Ministry of Finance regulates accounting for all other enterprises (ADB, 2005a). Interviews were conducted in the language of the interviewees and the resulting notes translated into English for analysis and citation. Although a set of key questions based on Boross et al. (1995) and Joshi and Ramadhan (2002) – supplemented by the professional experience and knowledge of the Kazakh researcher – was prepared, it was obviously impossible to envisage all possible lines of enquiry that might develop, given the changing state of the accounting system in Kazakhstan. Different questions were planned and asked during the two interviews because of the segregation of regulatory duties between the interviewees.

Implementation of IFRS in Kazakhstan interview questions — NBRK

1. The NBRK required commercial banks report financial statements prepared in accordance with IFRS before the new amendments to Accounting Law. What was the reason?
2. What other types of entities with the exception of commercial banks report to the NBRK? Are they also required to report in accordance with IFRS?
3. What are the functions of your department in relation to IFRS implementation?
4. Does the NBRK have an IFRS implementation plan?
5. What is the situation with IFRS at the moment? Do all commercial banks, pension funds and insurance companies keep their accounts in accordance with IFRS as required?
6. What are the main problems with the implementation?
7. IFRS is not an official document? What is the guidance for financial institutions?
8. What is your opinion on timeliness of IFRS implementation in Kazakhstan?
9. Do you have enough specialists?
10. Do you use consulting services? Who are your consultants?
11. Do you think that 2003 was a good time for adoption of IFRS?

Implementation of IFRS in Kazakhstan interview questions — MFRK

1. Who regulates accounting issues in the country today?
2. What were the motives for the adoption of the IFRS?
3. Did the Government undertake obligations to adopt IFRS?
4. Should a transfer from national to international standards have been implemented voluntarily or on an obligatory?
5. What is the IFRS implementation plan?
6. How you would describe the current situation in regulation of accounting in Kazakhstan?
7. To what degree have the companies adopted IFRS?
8. What should companies still do about the process of conversion to IFRS? What resources and expertise do they need to implement IFRS properly?
9. What are the implications of this change?
10. Are there advantages to be made from the adoption that will make implementation of IFRS more than just compliance with legislation?
11. What is the role of professional organizations?
12. What is the role of International organizations?
13. What is the level of authority carried by the MFRK as of today?
14. What are the main problems with the implementation?
15. What is the state of training of accounting specialists? Will the IFRS be included in the universities' curriculum?
16. Do you think that the country is ready to adopt IFRS?

Section 2: Survey Questionnaire

A postal questionnaire comprising of questions based in Boross et al. (1995), Joshi and Ramadhan (2002) and Illés et al. (1996), plus the professional experience of the Kazakh researcher, was sent to the 93 companies listed on KASE in July 2003, with 35 usable responses, a response rate of 43.2% (Chanchani & Willett, 2004; Joshi & Ramadhan, 2002). The questions are listed below are followed by tables detailing the responses. Some questions permitted multiple responses, and in these tables the number of responses does not total to 35 neither do the proportions total to 100%.

Name of the Company/Bank _____

Job title of respondent _____

Number of employees in the Company/Bank _____

1. Who are the main users of your financial statements? (*indicate all relevant boxes*)

Shareholders ☐

Employees ☐

Creditors ☐

Banks ☐

Other _____

2. Did you prepare financial statements in accordance with IFRS before Accounting Law dated 26 December 1995 #2732 (with amendments and additions)?

Yes

No ☐

If YES, what was the purpose?

3. As of today do you prepare financial statements in accordance with KAS?

Yes ☐

No ☐

If YES, what are the reasons?

4. Do you think that financial statements prepared under IFRS are more reliable for users?

Yes ☐

No ☐

Don't know/Find it difficult to comment ☐

5. What are the main problems your Company Bank faces while transferring to IFRS?

6. How many employees of your Company/Bank need IFRS training?

7. Do you find IFRS implementation process expensive for your Company/Bank?

Yes ☐

No ☐

Please comment on your answer:

8. What are the main expenses incurred by your Company/Bank while implementing IFRS? (Please list everything that you think is relevant).

9. Do you use consulting services for preparation of IFRS financial statements?

Yes ☐

No ☐

10. Do you have an independent audit of the financial statements?

Yes ☐

No ☐

If YES, which firm do you use?

☐ Big Four (Deloitte and Touche, EY, KPMG, PWC)

☐ Kazakh accounting/auditing firm

☐ Other _____

11. Is the audit limited to audit procedures or do the auditors do transformation of KAS accounts to IFRS?

12. What are the advantages of IFRS for you Company/Bank in particular?

13. Which of the following statements is the closest to your personal opinion (*tick one*):

- ☐ IFRS should have been adopted earlier by Kazakhstan
- ☐ Year 2004 is the most appropriate time for IFRS adoption
- ☐ It is too early to implement IFRS in Kazakhstan

You can comment on your answer below:

14. To what degree has your Company/Bank adopted IFRS? (*circle one number*)

Nothing has been done

Fully adopted



Section 3: Survey results

Classification of respondents by:	Number of firms	% of firms
Location		
Almaty	16	45.7
Astana	5	14.3
Other	14	40.0
Total	35	100.0
Economic sector		
Banking	12	34.3
Mining extractive	12	34.3
Services	7	20.0
Manufacturing	2	5.7
Other	2	5.7
Total	35	100.0
Number of employees		
Less than 1000	18	51.4
1000–10,000	12	34.3
Over 10,000	5	14.3
Total	35	100.0

Job title of respondents

Chief Accountant/Financial Director	18	51.4
Head of Accounting Department	5	14.3
Head of Accounting Methodology Department	5	14.3
Deputy Chief Accountant	5	14.3
Senior Accountant	2	5.7
<i>Total</i>	35	100

Question 1: Who are the main users of your Financial Statements?	Number of responses	%
Shareholders	15	42.9
Commercial banks	13	37.1
Creditors	8	22.9
Employees	6	17.1
Regulatory bodies	6	17.1
Totals (multiple responses)	48	n.a.
Question 2: Did you prepare IFRS statements before 1995?	Number of responses	%
Yes	28	80.0
No	7	20.0
Totals	35	100.0
Question 3: Do you prepare KAS statements today (July 2003)?	Number of responses	%
Yes	23	66.0
No	12	34.0
Totals	35	100.0
Question 4: Do you consider IFRS-based statements are:	Number of responses	%
More reliable for users	21	60.0
Less reliable for users	1	2.9
Statement difficult to answer	13	37.1
Totals	35	100.0
Questions 5–8: Identify problems you associate with IFRS implementation	Number of responses	%
Need for training	26	74.3
Cost of IFRS implementation	19	54.3
Lack of availability of competent specialists	16	45.7
Absence of detailed methodological recommendations	14	40.0
Lack of text books on IFRS	7	20.0
Inadequate computer software	5	14.3
Absence of proper translation of IFRS into Kazakh and Russian languages	5	14.3
Lack of proper instructions from regulatory bodies	2	5.7
Need for double purpose accounting to meet both tax and financial reporting requirements	2	5.7
Inadequate chart of accounts	2	5.7
Too tight deadline for adoption of IFRS	2	5.7
Incompliance of the IFRS with current legislation	2	5.7
Lack of knowledge of English	2	5.7
Totals (multiple responses)	104	n.a.
Question 9: Do you use external consulting services in the preparation of IFRS statements?	Number of responses	%
Yes	23	66.0
No	12	34.0
Totals	35	100.0

(continued on next page)

Question 10: Do you have an independent audit of your financial statements?	Number of responses	%
Big Four audit firm	28	80.0
Kazakh audit firm	5	14.3
Both types of firm	2	5.7
Totals	35	100.0
Question 11: Does your auditor transform KAS to IFRS statements?	Number of responses	%
Yes	16	46.0
No	19	54.0
Totals	35	100.0
Question 12: Identify the main advantages of IFRS.	Number of responses	%
Financial statements prepared under IFRS are more transparent and comprehensible to users	12	34.3
Financial statements prepared under IFRS will provide firms with easier access to international financial markets	10	28.6
Financial statements prepared under IFRS are more accurate and reliable	9	25.7
IFRS have more standards specifically relevant to the industry the respondent is in	2	5.7
Difficult to comment	2	5.7
Totals	35	100.0
Question 13: Do you consider:	Number of responses	%
Year 2004 is too early for adoption of IFRS	14	40.0
Year 2004 is the right time for adoption of IFRS	16	45.7
Year 2004 is too late for adoption of IFRS	5	14.3
Totals	35	100.0
Question 14: In your company are:	Number of responses	%
IFRS fully implemented	2	5.7
IFRS partially implemented	21	60.0
IFRS implementation not yet started	5	14.3
Declined to answer	7	20.0
Total	35	100.0

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Book Review Section

The book review section is interested in works published in any language, as long as they are comparative or international in character. The author or publisher of such works should furnish the book review editor with two (2) copies of the work, including information about its price and the address where readers may write for copies. Reviews will be assigned by the book review editor. No unsolicited reviews will be accepted. Suggestions of works that might be reviewed are welcomed.

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Book reviews

Accounting, accountants and accountability: Poststructuralist positions, N.B. Macintosh. Routledge, London(2005). xvi+165 pages, £22.99, \$39.95, ISBN: 0415384508

This is a paperback edition of a book originally published in 2002, in which Macintosh aims to explore new ways of understanding accounting. He argues that traditional views of accounting as the representation of an external economic reality are no longer tenable, whatever modern accounting standard-setters may believe. Instead of a concern with the extent to which accounting statements provide a true picture of that economic reality, in the sense that the statements correspond to “facts out there” that are independent of the accountant, Macintosh advocates a greater concern with the shifting “regimes of truth” that underpin accounting: those individuals and entities that have the power to declare whether or not particular accounting statements are true, the methods and procedures that are accepted at a given point in time for establishing what is true accounting, and the discourses and knowledge of accounting that are applied in uttering accounting statements that are deemed to be true at a particular point in space and time. In developing his argument, Macintosh uses ideas drawn from theorists such as Derrida, Baudrillard and Foucault, stressing that accounts are artefacts of language and thus are open to being understood through the lens of theories of language and discourse.

A major strength of the book is that Macintosh provides a diverse range of accounting-related illustrations to underpin his more abstract theorizing. For example, when discussing how Baudrillard’s ideas of simulacrum and hyperreality can provide an understanding of the problems faced by financial reporting in the 21st Century, Macintosh examines financial instruments, such as options, to suggest that the relationship between accounting measurement and economic valuations is often reversed. Conventionally, accountants are seen as using a market value that has been determined independently of the accounting and financial reporting process, and reporting this value in a neutral manner. The accounting sign depends on the external referent. But increasingly, in many financial markets, the market value of an instrument is itself often a calculated figure based on accounting numbers. The accounting sign no longer reflects an independent referent, but instead both sign and referent become mutually dependent. Although the book was written before the Enron scandal emerged, several of the accounting-related issues emerging from Enron provide clear illustrations of Macintosh’s arguments. The problems flowing from non-consolidated “special purpose entities” show how even the concept of the accounting entity is not a “given”, but rather is constructed (and deconstructed) in terms of rules and principles that gain their effect from the power of those who enforce the rules rather than from any inherent “rightness”. The use of “mark-to-model” valuation approaches to measure long-term contracts that had been cleverly structured as securities that could be traded in

theory if not in practice, and the recognition of valuation gains on such contracts as income, show not only the malleability of our concepts of income, but also the extent to which the way in which a transaction is to be accounted can shape the structure of the transaction itself. Accounting does not report neutrally, but instead often actively intervenes in shaping the economic world.

Although Macintosh goes a long way to undermining a naive realist view of accounting, he is aware that accounting influences a significant part of human activity. Accounting seems to work, but it is necessary, he argues, to consider for whom accounting works: who benefits from a particular form of accounting. As accounting is not static but dynamic, it must be studied and understood from within a historical perspective, one that examines how accounting practices come to gain their aura of objectivity and neutrality. Finally, is it necessary to develop alternative readings of accounting statements, and to allow accounting to tell different stories, to undermine still further the view that a single "true" accounting is not only possible but also desirable.

Macintosh is to be congratulated on presenting such a clear discussion of complex ideas, and on illustrating his theoretical concepts clearly by means of practical accounting situations. Like many critical accountants, he is stronger on identifying what is wrong with common understandings of accounting, and providing alternative ways of looking at accounting from the outside, than in giving a practical blueprint of how he believes accounting should change. His core belief is that attempts to develop accounting practice on the basis of insecure fundamentals, whether these involve a naive representationalist view of accounting, an economic analysis that regards accounting as simply an informational commodity, or a fixation on traditional concepts of capital and income, are doomed to failure in the long run. Macintosh's book should be required reading for anyone who needs to think critically about accounting, whether academic or practitioner, rather than merely to study and practice it as a set of mechanistic procedures.

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Applying International Accounting Standards, Keith Alfredson, Ken Leo, Ruth Picker, Paul Pacter, Jennie Radford, John Wiley & Sons, Brisbane, Australia (2005). 1102 pages, \$90.00, £34.99, €54.50 ISBN-10 0-470-80494-7

The demand for resource materials about international accounting standards has increased dramatically with the adoption of International Accounting Standards Board (IASB) standards in the European Union and many other countries from 2005. Adoption of international standards creates a need for tools to educate both students and practitioners about the "new" standards, so that the goal of more transparent and comparable financial reporting can be achieved. Alfredson et al. was one of the first texts published to meet that need.

The aim of the book is to help students and practitioners understand the complexities of international accounting standards and to apply the stable platform (p. viii), that is, the standards issued by the IASB as at March 2004. The authors note that the new standards "have major implications" for the practice of accounting, thereby affecting how accounting

is carried out in business and how it is taught in universities and colleges. In response to the global business environment and the principles-based nature of international standards, the approach taken in the text is to place “greater emphasis on understanding accounting principles rather than applying specific local regulations” (p. xiii).

A striking feature of the book is the credentials of the authors who have, collectively, a very impressive track record. Their experience encompasses many years in professional accounting practice, participation on standard-setting boards, roles as academics and educators, and extensive experience in writing books and monographs. The combined experience of the author team leaves no doubt that we are in the hands of skilled professionals who are able to unravel the mysteries of international accounting standards with accuracy and clarity.

The book is structured in four parts as follows:

- Part 1 *Framework*, includes two chapters. The first provides background about the IASB so we can learn of the history of standard setting as well as current arrangements. The second chapter provides an analysis of the IASB’s Framework. This chapter is crucial, given the book’s aim of developing readers’ understanding of accounting principles. The Framework is an important starting point for understanding the content and interrelationship of current standards.
- Part 2 *Elements*, covers the three elements of assets, liabilities, and equity. Elements of equity (share capital, retained earnings, and reserves) are analyzed. In the asset category, inventories, intangibles, leases, and property plant and equipment are the subject of four separate chapters. Liabilities are addressed with a chapter on provisions and contingencies. Two further chapters address topics relevant to both assets and liabilities — income tax and financial instruments. Business combinations and impairment are also covered because of their effects on the recognition and measurement process (p. xiii).
- Part 3 *Disclosure*, includes three chapters covering the principles of disclosure (IAS 1, IAS 8, and IAS 10), presentation of financial statements, and cash flow statements. These chapters are extremely helpful for understanding the required content and presentation of IFRS financial reports. The chapters draw out key issues from the accounting standards, thus assisting instructors to understand the fundamental issues that must be communicated to students. While instructors may refer directly to accounting standards, it is helpful to have the guidance of experts when developing an understanding of the new rules.
- Part 4 *Economic entities*, provides material for a serious investigation of the practice of consolidated reporting. It comprises about 40% of the (approximately) 1,000 pages of the text and covers the key issues relating to consolidations: the method, treatment of wholly owned subsidiaries, intragroup transactions, minority interests, and indirect ownership interests. The coverage is broad but detailed enough to assist the development of a sound understanding of consolidations suitable for students majoring in financial accounting studies. The material is very similar to that presented in a previous work by some of the authors (Leo, Hoggett, Sweeting & Radford, 2001), so it has been developed over a number of editions. Part 4 also includes chapters on topics often taught along with consolidations, namely foreign subsidiaries (which covers foreign currency translation), investments in associates (equity accounting), interests in joint ventures, and segment reporting.

The above list of content provides an indication of the wide scope of the book. The first part sets the scene and provides relevant qualitative material. The second section covers many topical issues and new accounting standards. It provides sufficient material for an entire unit on recognition and measurement of assets, liabilities and equity, either as a stand alone unit or as an introductory unit before a more in-depth consideration of business combinations.

Throughout the book the skills of the author team are apparent. First, their technical knowledge is outstanding. The material presented is soundly based on accounting standards and also, when appropriate, the basis for conclusions underpinning the standards. Full references to standards are included to assist the process of understanding the standards. The material is explained in detail and links made between the standards and other practices (e.g., U.S. GAAP) if appropriate. The detailed explanations are of great assistance to those learning about the new standards, either as students or instructors.

Second, the setting out of the material in each chapter reflects considerable thought about the most effective way to present relevant content. Each chapter makes use of descriptive sections, many explanatory diagrams and figures. Material is arranged with careful use of headings, sub-sections and dot points to assist readers to follow the content. The chapters include numerical examples and journal entries where appropriate to demonstrate the practical aspects of the topic being addressed. Comprehensive examples, which draw together several points developed in the chapter, are also provided. Examples are generally "country neutral", that is, there is a focus on illustrating a point in question in relation to international standards without reference to a particular country. In some chapters practical applications of the standards are explored by considering actual listed companies. Selections of media articles are reprinted to give a "real world" flavor and to show how issues apply in practice. These sections will prove popular with students and add richness to the text.

Each chapter includes discussion questions and problems. They are based on the material in the chapter and cover many key issues and complexities. In fact, the book would benefit from some simpler questions for people who are new to the content or who are struggling to understand it. Each chapter needs some "easy" questions, where basic principles are demonstrated, to give less experienced people a chance to develop some knowledge and understanding. More detailed questions, which cover the complexities of the standards, can follow. In addition, many accounting topics require students to master journal entries. Understandably, students like questions where they can "practice" their journal entries, thus creating a demand for the lecturer to provide such questions. As just one example, I would like to see more questions which require students to prepare journal entries as part of the process of accounting for financial instruments. Realistically, there is much about financial instruments my students will not learn or remember. However, I would like them to master the basic measurement rules and the journal entries required for various instruments. I would like more end-of-chapter questions which help them to do this. The publishers are aware of the need for simpler questions and had planned on publishing an enhanced edition of this text in November 2006. More questions and problems are expected to be provided in this subsequent edition. The publishers provide useful resources for instructors, including a detailed solution manual as well as topic tests. Resources are accessed online through the publisher's website.

The text addresses the stable platform of standards, that is, those issued by the IASB at 31 March 2004. Subsequent changes have been made to some standards. This is a problem faced by all publishers and instructors. Since the text provides such a comprehensive

coverage of the original set of standards, it forms a useful starting point. For many classes, instructors can focus on the material in the book because it covers principles which remain in force. Information about current developments can be obtained, if required, from online resources such as the IASB's websites or Deloitte's IAS PLUS.

Alfredson et al. meet an important need in the current world of accounting education as teachers require up-to-date texts on international standards. This book addresses many complex issues in a thorough manner and will be a very valuable resource for many academics as we grapple with international standards. The authors are to be commended for their contribution to the process of introducing international accounting standards to both instructors and students.

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Leo, K., Hoggett, J., Sweeting, J., & Radford, J. (2001) *Company accounting*. Australia: Wiley

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Financial Accounting Theory, Craig Deegan, Jeffrey Unerman, European Edition, McGraw-Hill Companies, Inc., Maidenhead, UK (2006), xix + 466 pages, £38.99, ISBN: 13 9780077108960

This accounting theory book of Craig Deegan and Jeffrey Unerman provides an overview of some well-established accounting theories. The book covers normative and positive theories, discusses research on the reaction of capital markets and individuals to financial reporting, and devotes a chapter to the critical accounting perspective, and a chapter to social and environmental reporting. For this European edition, the authors have introduced many European examples, which make the text very lively for a European audience.

The material covered is organized in 12 chapters. In the first, introductory chapter, Deegan and Unerman point out what a theory is, and why one should be motivated to study accounting theory. They stress that accounting theories provide insights that are crucial to improve financial accounting practices, and to restore investor trust in capital markets, which was severely damaged after the recent wave of high-profile accounting scandals. In this introductory chapter, the authors also give a brief taxonomy of accounting theories (i.e. positive versus normative theories, true income theories, and decision usefulness theories) and discuss how one can evaluate those theories.

In Chapter 2, the authors stress that accounting method choices, professional judgment, and accounting standards influence accounting numbers and can lead to different pictures of the "economic reality". Therefore, they claim, users of financial reports should understand financial accounting. The chapter also provides an overview of accounting history, leading to an introduction to and discussion of theories that favor or oppose accounting regulation, and theories about why regulation is introduced (namely, public interest theory, capture theory, and private interest theory). The authors clearly point out that regulation of accounting can

have economic consequences. They also argue that accountants are quite powerful. However, as accountants work within or for organizations, and as the board of directors bears first responsibility for the accounts, I believe that accounting method choices and professional judgment are likely to be influenced by other persons in the organization as well.

Chapter 3 continues the discussion of theories that favor or oppose the regulation of accounting. The "free market" and the "pro-regulation" perspectives, and the public interest and capture theories of regulation are considered. These theories are discussed against the background of the increase in accounting regulation following the recent wave of high-profile accounting failures, and of various International Accounting Standards Board (IASB) pronouncements. Deegan and Unerman conclude the chapter with challenging whether accounting can be neutral, objective, and apolitical.

Chapter 4 first refers to some evidence on the impact of differences in regulation across countries on accounting practice. Next, the chapter discusses various cultural and institutional reasons for the observed differences in accounting systems across countries. As concerns culture, the work of Gray (1988) and Hofstede (1980) is considered. As concerns institutional factors, the impact of factors such as legal systems, business ownership, and the financing system are considered. Following the work of LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (1997), LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (1998), LaPorta, Lopez-de-Silanes, and Shleifer, (1999), the impact of institutions on accounting issues has been a vibrant research stream, and I miss some references to recent work on this topic. The chapter continues with a discussion of the reasons for and obstacles to international harmonization or standardization. The chapter concludes with an overview of the processes and institutions of harmonization and standardization that are important for accounting regulation in the European Union (EU).

Chapters 5 and 6 are devoted to normative theories of accounting. In particular, Chapter 5 discusses various normative theories of accounting that start from the idea that historical cost accounting has too many shortcomings, particularly in times of inflation. Current purchase power accounting (CPPA), current cost accounting (CCA), and continuously contemporary accounting (CoCoA) are considered. The chapter also provides an overview of research that sheds some light on the demand for price-adjusted accounting, and gives a description of the support for non-historical cost accounting across time. Chapter 6 continues the discussion of normative theories of accounting with a discussion of the motivation for the existence, and the advantages and disadvantages of a conceptual framework for accounting.

Chapters 7 and 8 are dedicated to positive theories of accounting. In particular, Chapter 7 gives a thorough overview of Positive Accounting Theory. The chapter starts with a definition of Positive Accounting Theory, and continues with a discussion of its origins, its development, its efficiency and opportunistic perspectives, and its three main hypotheses (the bonus, debt, and political cost hypotheses). The chapter concludes with an overview of some criticisms of Positive Accounting Theory. Chapter 8 continues the discussion of positive theories of accounting with a discussion of three "systems oriented theories", namely legitimacy theory, stakeholder theory (both the ethical and the managerial branch), and institutional theory. This discussion is preceded by a discussion of a broader theory underlying legitimacy and stakeholder theory, namely political economy theory. In this chapter, the authors complement a discussion of the theories with an overview of the results of empirical tests of the theories.

Chapter 9 is devoted completely to social and environmental reporting. In this chapter, the authors discuss why companies engage in social and environmental reporting, to whom companies address the social and environmental reports, what information stakeholders need, and various aspects related to the reporting process itself.

While the previous chapters considered how financial accounting should be undertaken (normative theory), or why firms make some accounting and disclosure choices (positive theory), Chapters 10 and 11 deal with how markets and individuals react to alternative accounting and disclosure decisions. In particular, Chapter 10 provides an overview of capital markets research, which examines how capital markets (share prices) react to the release of information. Chapter 11 focuses on behavioral research, which studies the impact of information on the decisions of a variety of individual information users (not just investors, but, for example, also auditors, bankers, and loan officers). The Brunswick Lens Model, Verbal Protocol Analysis, and the limitations of behavioral research are considered.

The final chapter, Chapter 12, is dedicated to the critical perspective on the role of accounting, and to the role of accounting research and accounting practice in supporting existing social structures.

In short, I believe that the book gives an interesting introduction to a broad range of accounting theories. The book is well organized. At the start of each chapter, a list of learning objectives and an opening issue are provided, and throughout the book, there are various exhibits with real-world examples. Moreover, at the end of each chapter, the authors provide a useful summary and many discussion questions for classroom use. The authors also discuss all issues against the background of recent developments within the European Union.

In my opinion, the content, European perspective, and well-organized structure make the book a good text for students willing to pursue a research career in accounting, and an interesting reference work for accounting researchers. Since the book covers a broad range of theories, students or researchers willing to apply one of these theories in their own work may want to read more about the particular theory. Therefore, they can turn to the list of references at the end of each chapter.

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Auditing and Assurance Services International Edition, Aasmund Eilifsen, William F. Messier Jr., Steven M. Glover, Douglas F. Prawitt. McGraw-Hill Education, Berkshire (2006), xxiv + 678 pages, £34.99, €54.94, ISBN: 13 9780077104177; 10 0-07-710417-X

The first edition of *Auditing & Assurance Services International Edition* is truly an international auditing book. By integrating discussions of auditing concepts and processes with International Standards on Auditing (IASs), the authors bring an international perspective throughout the book. As globalization increases and with it the international operations of audit firms, the authors remind us that students and professionals need to “understand the international environment shaping the profession and international auditing pronouncements” (p. xii). This book aims to provide that understanding and, in my assessment, achieves its objective.

1. Organization of the book

The book is organized into eight parts. Part I (chapters 1 and 2) provides an introduction to financial-statement auditing, and the international environment. Part II (chapters 3 and 4) covers the basic auditing concepts of Risk Assessment, Materiality, and Evidence. Part III (chapters 5–7) covers audit planning and internal control. Part IV covers (chapters 8–9) Statistical and Non-Statistical Sampling Tools for Auditing. In Part V (chapters 10–16) auditing issues related to business processes — revenue, purchasing, human resource management, inventory management, assets, liabilities, and cash and investments are discussed. Part VI (chapters 17–18) covers audit completion and reporting responsibilities. The final two parts (chapters 19 and 20) cover professional responsibilities of auditors and assurance and other related services. At the beginning of each chapter the learning objectives and relevant international accounting and auditing standards are listed. Each chapter ends with definitions of key terms, review questions, problems, discussion cases, and internet assignments.

To enhance real-world understanding, the authors include analyses of Earthware Clothiers, a mail-order retailer, throughout the book. Readers are introduced to the company's Annual Report following chapter 1, and many chapters include problems and internet assignments relating to this company.

The book is written in a clear, straightforward manner. Although modeled after the U.S. edition,¹ the authors have clearly written the book with an international perspective. Frequent references to ISAs, and the use of the Euro as the currency in the financial statements throughout the book enhance the international flavor.

A discussion of some selected chapters follows. Chapter 1 starts with the discussion of Enron and the demise of Andersen, and other examples of fraud in Europe, Asia, and Australia. This is followed by discussion of the nature of an audit, the role of auditing in society, and the major phases of the audit, all of which are common to all environments. The

¹ Although it is the first international edition, the book under review is based on the 4th edition of *Auditing and Assurance Services: A Systematic Approach* (Messier, Glover, and Prawitt, 2006).

chapter concludes with an interesting example about how to verify the inventory of reindeer heads. Chapter 2 provides a discussion of the global environment in which the auditor operates. It provides references to frauds that occurred in several countries (United Kingdom, Netherlands, Ireland, Switzerland, Spain, Italy, Belgium, Sweden, France, Germany, Japan, Australia, and South Korea). Students of various countries will be able to relate to the implications of these frauds because of the local attention the companies receive from the media. More importantly, the chapter also provides a detailed and interesting discussion of International Auditing and Assurance Standards Board, International Standards on Auditing, International Federation of Accountants, European Union and the Regulatory Environment in the USA. In the next edition, the authors might consider adding discussions of *foreign* audit firms that are registered with the PCAOB (there are firms from India, Czech Republic, Hong Kong, United Kingdom, Germany, Switzerland, Thailand, and many more countries that are currently registered with the PCAOB).² This will further highlight the importance of international auditing.

Chapter 6 uses the COSO (Committee of Sponsoring Organizations of the Treadway Commission) framework for Internal Control and its components to discuss auditors' assessments of internal control. Chapter 7 (that primarily focuses on US standards) discusses standards (following the Sarbanes Oxley (SOX) Act of 2002) relating to the audit of internal control. Because the newly adopted SOX standards on auditing internal control affect both foreign auditors and foreign companies, this is an important chapter. The chapter begins with the responsibilities of management and auditors, and proceeds to a discussion of control deficiencies, significant deficiencies, and material weaknesses and internal control reports. Both integrated audit and internal control and internal control reports are discussed. The PCAOB AS2 standard is nicely incorporated in this chapter.

Also of interest is chapter 18, which discusses audit reports using reporting format. Conditions (e.g., going-concern problems, scope limitation, departure from applicable financial-reporting framework) leading to different types of audit reports with illustrative examples are discussed. Topics dealt with in the concluding section of the chapter include reports on comparatives, other information in documents containing audited financial statements, and special reports.

Chapter 19 covers important issues relating to professional ethics, independence, and quality control. The chapter starts with a discussion of ethics and ethical professional behavior. The authors do a fine job of presenting the conceptual-framework approach to auditor independence. There is a section on conflict of interest covering issues such as obtaining second opinion, fees, marketing of services, gifts, custody of assets, and objectivity. The chapter also covers issues such as employment with assurance clients, provision of non-audit services to assurance clients. Some of these issues have surfaced in recent fraud investigation occurrences at Enron, WorldCom, and Learmonth and Hauspie. The book (Chapter 20) concludes with a discussion of various types of "Assurance Services" and internal audit services.

In sum, the book is comprehensive in its coverage of auditing issues in an international environment. However, while the U.S. edition of Messier et al. includes a chapter on litigation in the U.S. context, the current book (the international edition) does not. I would argue that

² http://www.pcaobus.org/Registration/Registered_Firms.pdf

some discussion of legal liability in the U.S. would be useful to non-U.S. auditors and corporations because of the global nature of auditing. Similarly, including a brief discussion of U.S. GAAS somewhere in the book could be useful to an international audience.

2. Support materials

The book comes with supplements (PowerPoint slides and weblink) accessible by students from a website. The PowerPoint slides are of good quality and some slides include cartoons that students will enjoy. The instructor's resources include manuals for solutions and instruction. I would recommend the inclusion of a test bank as well. There are links to international accounting and auditing organizations and international audit firms. Unlike the U.S. edition (which is one of very few auditing text books that includes the Audit Command Language (CDROM)), the international edition does not come with the ACL Software CD. The book provides some discussion of the ACL software with examples in the context of audit sampling and in chapter 7.

3. Conclusions

I commend the authors for writing this book with a truly international approach. It is clearly written, and is supported by appropriate examples and figures. ISAs have increasingly been accepted by many international accounting firms, multinational public companies, among others, and have received endorsement from international organizations such as the Organization for Economic Cooperation and Development (Roussey, 1999).³ Several countries have either adopted or used ISAs as the basis for their auditing standards. Netherlands' Auditing Standards Board has decided to "forgo the further development of national auditing standards and adopted ISAs instead." (Roussey, 1999). The U.K. auditing practices board "based its standards on the ISAs but used different wording and added local requirements." Given this trend, ISAs will probably be used either in their entirety or in modified form by many more countries in the future. Consequently, this book offers an appropriate international perspective to auditing and can be used in undergraduate and graduate auditing courses and by practicing professionals.

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³ http://www.nyssecsa.org/cpajournal/1999_1099/Features/F141099.HTM

A woman dances with her son

**because of brain surgery that
reduced her epileptic seizures**

**performed by a neurosurgeon who was
able to pinpoint the foci of the seizure**

**due to breakthroughs in the
mapping of the human brain**

**advanced by physicians, mathematicians
and computer engineers around the world**

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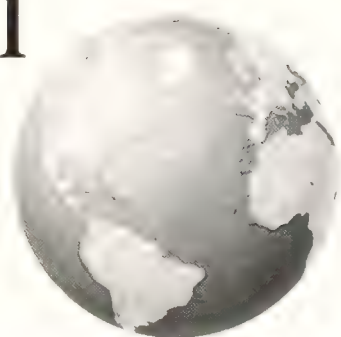
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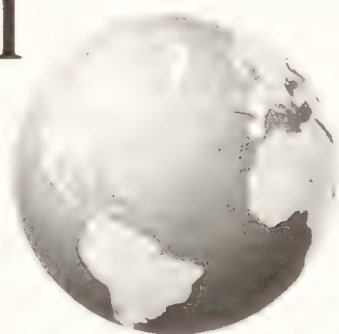
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Attribute differences between U.S. GAAP and IFRS earnings: An exploratory study [☆]

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Abstract

In this study we explore attribute differences between U.S. GAAP and IFRS earnings. Our study is motivated by the ongoing harmonization process in accounting standard setting as well as by recent convergence projects by the FASB and the IASB. We test two market-based earnings attributes, i.e., value relevance and timeliness, as well as two accounting-based earnings attributes, i.e., predictability and accrual quality. These attributes are tested for German New Market firms as they are allowed to choose between IFRS and U.S. GAAP for financial reporting purposes. Overall, we find that U.S. GAAP and IFRS only differ with regard to predictive ability. The fact that U.S. GAAP accounting information outperforms IFRS also holds after controlling for differences in firm characteristics, such as size, leverage and the audit firm. However, our results also seem to suggest that these differences are not fully valued by investors, as we do not observe significant and consistent differences for the value-relevance attribute.

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Keywords: Global accounting standards; IFRS; U.S. GAAP; Earnings quality; Comparison

1. Introduction

When comparing and characterizing accounting-standard regimes, IFRS are typically labeled as concept-based while U.S. GAAP are categorized as rule-based. During recent years

This study was presented at the Illinois International Accounting Symposium held jointly with HEC in Paris on June 7–8, 2006.

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the FASB repeatedly solicited for research on the feasibility of changing towards more concept-based standards, as more and more criticisms of its current approach arose, especially in the aftermath of Enron. Rule-based standards are said to provide companies with the opportunity to structure transactions to meet requirements for a particular accounting treatment, even if such treatments do not reflect the true economic substance (see, for example Vincent et al., 2003). Likewise, Sawabe (2005) establishes that proliferation of accounting rules, as in a rule-based approach, is usually associated with more creative accounting instruments, suggesting that it leads to more earnings management.

In this paper, we add to the ongoing IFRS/U.S. GAAP discussion by investigating a set of earnings attributes. Prior empirical research on quality differences between U.S. GAAP and IFRS is scarce and provides mixed results. In a U.S. exchange context, Harris and Muller (1999) find that the reconciliations from IFRS to U.S. GAAP in Form 20 F filings add value. By contrast, based on a sample of German New Market firms, Leuz (2003) and Bartov, Goldberg, and Kim (2005) document that both U.S. GAAP and IFRS offer no significantly different quality. While Leuz defines quality as a function of (less) information asymmetry (bid–ask spreads) and (more) market liquidity (trading volume), Bartov et al. (2005) relate market data back to accounting information in returns/earnings regressions. In the present study, we further focus on German New Market firms and test several accounting and market-based quality measures (i.e., value relevance, timeliness, predictability, and accruals quality) to draw inferences about attribute differences between IFRS and U.S. GAAP earnings. We restrict our sample to German New Market firms for the following reasons. First, the need for high quality financial information is particularly prevalent for these types of new economy firms. Due to unstable performances and the limited financial history of the firms quoted on this market, investments in such firms are highly risky, which makes the (quality of) current financial statements highly relevant to investors, especially as the period studied is characterized by a turbulent stock market. As a result, the findings of this study are such that they reflect the relative performance of the two regimes, IFRS and U.S. GAAP, in periods of economic downturn. Second, by limiting our sample to one equity market, we control for (institutional) variation in market features (Barth & Clinch, 1996). This is necessary as some of the metrics adopted in our study are based on equity-market variables.

As we execute a comparative study, we address prior claims (such as the one by the SEC) that the FASB provides qualitatively better standards than the IASC. Note that such claims led to reconciliation requirements (to U.S. GAAP) for foreign filers on U.S. exchanges that are adopting IFRS. Prior studies that addressed this issue focused mainly on U.S. markets. However, according to Glaum and Street (2003), U.S. GAAP disclosures are generally of lower quality in non-SEC environments. Hence, exploring the differences between IFRS and U.S. GAAP earnings of German New Market firms that fall outside SEC enforcement further contributes both to the reconciliation and enforcement debate. Further, we address a comprehensive set of earnings attributes both capital market and accounting based to evaluate financial reporting quality, whereas prior studies comparing standards typically limit their scope to value relevance (of earnings). Finally, by comparing IFRS and U.S. GAAP prepared information, we examine whether concept-based versus rule-based standard regimes result in significantly different information.

We find that U.S. GAAP and IFRS earnings perform equally well on most of the attributes we investigate. With regard to predictive ability, however, U.S. GAAP earnings significantly outperform IFRS. These results hold even when controlling for firm characteristics such as size and leverage. Interestingly, the value-relevance attribute does not differ significantly and consistently between the two sets of standards, suggesting that the accounting differences are not fully valued by investors.

The remainder of this paper is organized as follows. Section 2 provides a review of the existing literature on accounting regime evaluations and earnings-attribute measures, followed by our expectations for the IFRS U.S. GAAP comparison. In Section 3, we specify the models that we use to estimate and evaluate the earnings attributes. Next, we document the sample composition and data collection in Section 4. We present the results in Section 5 and finally give some concluding remarks in Section 6.

2. Literature review and research questions

Previous studies that evaluate the quality of standards across regimes can roughly be divided into two groups: those comparing U.S. GAAP to other local regimes, and those comparing IFRS with local regimes. Studies that report under the first group typically have two common features. First, almost all studies are performed using a sample of U.S. and non-U.S. companies listed on the same U.S. stock exchange. This is an interesting setting since foreign filers are allowed to report under their local standards, provided there is a reconciliation of earnings and shareholders' equity with U.S. GAAP (called 20F reconciliation). Second, quality is most often measured by applying value-relevance models, looking at the association between stock prices (or returns) and accounting data.

In comparing U.K. and U.S. GAAP constructed earnings (and earnings changes), Pope and Rees (1992), conclude that U.S. GAAP earnings adjustments add only marginally to the ability of earnings to explain returns. Comparing U.S. GAAP with multiple local GAAP systems, Amir, Harris, and Venuti (1993) find that the 20 F reconciliations made by Non-U.S. filers are reflected in stock prices and thus are valued by the market. By contrast, Chan and Seow (1996) find earnings based on local GAAP to have greater information content than U.S. GAAP.

Splitting up the group of foreign filers, Barth and Clinch (1996) document variations depending on the country of residence. For U.K. and Australian firms, the reconciliations are found to be valued more than for Canadian firms. Given that U.S. GAAP and Canadian GAAP are similar for many items, this finding suggests that the usefulness of reconciliations to U.S. GAAP decreases, as the foreign GAAP is more closely comparable to U.S. GAAP. Alford, Jones, Leftwich, and Zmijewski (1993) reach similar conclusions when considering several European local GAAP systems. They conclude that earnings based on Danish, German, Italian, Singaporean and Swedish GAAP contain less information and are less timely than U.S. GAAP earnings, while earnings based on local GAAP of Australia, France, The Netherlands and the U.K. are relatively more informative and timely.

Overall, results about U.S. stock exchanges seem to suggest that from an investor's perspective reconciliations add value. While all the above studies compare U.S. GAAP to other accounting regimes within a U.S. stock exchange environment, Harris, Lang, and Moller (1994) is the only study that provides an analysis of value relevance across

exchanges. Similar to the U.S. stock exchange studies, Harris et al. (1994) assess quality by looking at the association between prices and earnings (or shareholders' equity). These associations are however not calculated for the entire sample, but for the German and U.S. stock market separately. They find that the explanatory power of German earnings is comparable to U.S. earnings, but the explanatory power of shareholder's equity in Germany is significantly lower than in the United States.

Research on quality differences between U.S. GAAP and IFRS is scarce. Harris and Muller (1999), for instance, use U.S. stock exchange data, in particular a sample of foreign firms that prepare IFRS earnings for domestic purposes and in addition reconcile from IFRS to U.S. GAAP in Form 20 F filings, for cross-listing purposes. Value is defined in terms of price and return models and it is found that the reconciliations add value. By contrast, subsequent studies by Leuz (2003) and Bartov et al. (2005) document that both U.S. GAAP and IFRS offer no significantly different quality. Both studies use a sample of German New Market firms since these companies can freely decide to apply either IFRS or U.S. GAAP. The studies differ as to the applied quality metrics: Leuz defines quality in terms of information asymmetry (bid–ask spreads) and market liquidity (trading volume), while Bartov et al. (2005) apply the more traditional value-relevance measures (also applied by Harris and Muller). Recently, Barth, Landsman, Lang, and Williams (2006) report on the IFRS/U.S. GAAP issue by studying a matched sample of European and U.S. firms. Applying multiple measures (e.g., earnings management), they find that IFRS provide lower quality accounting information, but the imbalance disappears when looking only at U.S. cross-listed firms. In the present study, we follow the same vein as Barth et al. (2006) looking at several quality measures. We focus on one specific environment, however, the German New Market, to keep institutional factors (such as enforcement) as homogeneous as possible. In sum, this study explores some of the inconsistencies in prior research, and adds to the literature on standards enforcement.

In addressing the IFRS/U.S. GAAP dilemma, we argue that differences between the two sets of standards are likely to be relevant. First, on a very general level, we discern both structural and organizational differences between the two sets of standards that might impact the quality of the accounting information prepared accordingly. Proponents of U.S. GAAP typically argue that the international standards have not been subject to the same due process as U.S. standards. Both the FASB's organizational structure, its standard-setting process and the enforcement is claimed to be better defined. However, others argue that the IFRS standard-setting process is open to more input from a wider interest group.

Second, turning to the standards themselves, it is often illustrated that U.S. standards are rigorously defined, resulting in a real cookbook of detailed and stringent accounting and disclosure requirements. Considerable attention is paid to exceptions and special issues and extensive guidance is provided on specialized industry practices. The IASB (International Accounting Standards Board) standards book, on the other hand, is far less voluminous and standards are defined more generally in terms of rules. Whether stricter rules also result in higher quality accounting information remains, however, an open question. One could argue that information resulting from the application of U.S. standards is more neutral since there are fewer opportunities to manage earnings. Reporting on economic activity is more likely to be truthful and consistent if firms are offered fewer opportunities to color the image they communicate in order to influence behavior in a particular direction. However, one

could also argue that the discretion offered by IFRS puts management in a position to more freely signal the true economic performance of the company.

Finally, differences in specific standards may also be responsible for differences in the quality of earnings. For example, the opportunity to capitalize R&D under IFRS could result in more value-relevant earnings.¹ Making predictions on earnings and its attributes is, however, complicated, mainly because it is uncertain whether managers choose the accounting treatments on which IFRS and U.S. GAAP differ. Returning to the R&D example, managers could expense development costs even though capitalization is allowed, simply because it is not opportune at that time. Further, since accounting involves reverting effects over time, and we cannot determine the application lag for each company and each item, the earnings-attribute effect is indistinct.

Based on the above-mentioned arguments, we do expect differences between IFRS and U.S. GAAP earnings to exist. However, it is a priori not clear which set of standards will result in higher accounting quality.

3. Model specification

To examine quality differences between information prepared based on IFRS versus U.S. GAAP, we build on the existing literature, which expresses the quality of earnings in terms of earnings attributes (e.g., Schipper & Vincent, 2003). At the outset, it is important to observe that we do not address the question of what high-quality accounting is or should be. Instead, we follow prior literature and define quality in terms of earnings attributes. Where prior studies usually tend to focus on one or two earnings attributes at a time (e.g., Bartov et al., 2005; Harris & Muller, 1999), we consider four attributes: value relevance, timeliness, predictability, and accruals quality. The first two reside under the market-based attributes, while the last two are examples of accounting-based attributes. By including this range of attributes, we are able to evaluate whether differences in the accounting standards actually show up in the earnings numbers and its properties, and whether the market values these differences.

For each earnings attribute, we estimate two separate models for the respective samples of IFRS and U.S. GAAP firms. Differences between IFRS and U.S. GAAP earnings with regard to these attributes are reflected in the differences in R^2 found between the models.² To assess whether a difference in the R^2 is statistically significant, we need to control for between-sample differences. To that end, we use the same test statistic as Lang, Ready, and

¹ For a full comparison, we refer to the FASB's study (Bloomer, 1999) *The IASC-U.S. Comparison Project: A Report on the Similarities and Differences between IASC Standards and U.S. GAAP*-second edition.

² Most studies comparing IFRS and U.S. GAAP are executed on samples of firms that report under the two reporting regimes simultaneously. Each sample firm is included twice in the study: once running the prices on IFRS measures and once on U.S. GAAP measures. If the number of measures is held constant, then comparison between the two regimes happens directly through comparison of the R -squares. To statistically test the difference, a Vuong test is used (see Dechow, 1994). In this study, we also compare an IFRS and U.S. GAAP model, however the models (and the resulting R^2) are estimated using different samples as firms are either applying IFRS or U.S. GAAP. To compare these R -squares we control for sample differences by using the Cramer-based test.

Wilson (2006) and Barth, Landsman, and Lang (2005), based on the estimation of R^2 standard deviations (see Cramer, 1987).

3.1. Value relevance

Unlike early capital market research (e.g., Ball & Brown, 1968; Holthausen & Watts, 2001), we do not simply investigate the link between prices and earnings, but we also take into account that market prices react differently to positive and negative earnings (e.g., Bartov et al., 2005; Collins et al., 1999). Hence, we measure value relevance in terms of the contemporaneous association between stock returns and earnings as follows:

$$RET_{i,t+3} = \alpha_0 + \alpha_1 \frac{X_{it}}{P_{i,t-1}} + \alpha_2 DX + \alpha_3 \frac{X_{it}}{P_{i,t-1}} * DX \quad (1a)$$

where $RET_{i,t+3}$ is the annual market-adjusted return, ending three months after the fiscal year end, X_{it} is earnings per share, DX is a dummy equal to one if earnings are negative and zero otherwise, and $P_{i,t-1}$ is the security price at the beginning of the period. The model's R -squared, which reflects the degree of association, is estimated for the IFRS and U.S. GAAP sample separately. Second, we also run the price-earnings model as suggested by Ohlson (1995) and Burgstahler and Dichev (1997), where prices are regressed on both earnings and the book value of equity (e.g., Penman, 1998). We also distinguish between positive and negative earnings, resulting in the following regression:

$$P_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 DX + \alpha_3 X_{it} * DX + \alpha_5 BV_{i,t-1} \quad (1b)$$

where P_{it} is the security price three months after fiscal year end t , $BV_{i,t-1}$ is the book value of equity at the beginning of period t , and other variables are as previously defined. In this regression, the coefficient on earnings, α_1 , reflects the pricing effect of current earnings. The coefficient on beginning-of-year book value of equity captures the effect of expected future normal earnings.³ Again, our measure of value relevance is based on the explanatory power of the equation.

3.2. Timeliness

Consistent with prior research, we test this attribute by running the following Basu-like (1997) reverse regression on the two samples separately:

$$X_{it}/P_{i,t-1} = \alpha_0 + \alpha_1 RET_{it} + \alpha_2 DR + \alpha_3 RET_{it} * DR \quad (2)$$

with RET_{it} being the annual market-adjusted return (corresponding to the fiscal year), DR equaling one if returns are negative and zero otherwise, and all other variables as previously defined.⁴ Timely earnings are those earnings that result in stronger associations or higher R^2 s for the above model.

This is one way of controlling for growth opportunities, as suggested by Holthausen and Watts (2001).

³ Both the returns and the accounting data are measured at fiscal year end so that they both relate to the same time period. By contrast, returns in the value-relevance models go from three months before to three months after the fiscal year end. Hereby, we take into account that financial statements usually are published within three months after fiscal year end, and are thus reflected in share prices.

3.3. Predictability

In testing whether IFRS earnings have different predictive ability than U.S. GAAP earnings, we model the association between future and current earnings as well as past earnings (Lipe, 1990) for the IFRS and U.S. GAAP sample separately. We estimate the R^2 of the following model:

$$X_{i,t+1} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 X_{i,t-1} \quad (3a)$$

where X_i is earnings per share for firm i either in fiscal year $t+1$, t or fiscal year $t-1$, and all variables are scaled by a firm-size measure, that being sales in year t .⁵ In addition, we also run the Dechow et al. (1998) model, where we regress future operating cash flows on current and past accounting information. The model is as follows:

$$OCF_{i,t+1} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 X_{i,t-1} \quad (3b)$$

where OCF_i is the operating cash flow for firm i in fiscal year t , scaled by total sales, and all other variables are as previously defined. Again, the model's R -squared is indicative of the predictive ability of current accounting information, with higher values reflecting more predictive ability.

3.4. Accruals quality

Following the Dechow and Dichev model (2002), we run changes in working capital on past, present, and future cash-flow realizations (see also Aboody & Liu, 2003; Francis et al., 2003; Myers et al., 2003). The focus is on working capital, since related cash-flow realizations generally occur within one year. The model is estimated for the IFRS and the U.S. GAAP sample:

$$\Delta WC_{it} = \alpha_0 + \alpha_1 OCF_{i,t-1} + \alpha_2 OCF_{it} + \alpha_3 OCF_{i,t+1} \quad (4a)$$

where ΔWC are changes in working capital (scaled by total sales) and all other variables are as previously defined. As pointed out by Dechow and Dichev (2002), a positive sign is expected on both past and future cash flows and a negative sign on current cash flows. A higher explanatory power of the model indicates high earnings or accruals quality. To control further for quality effects caused by the negative coefficient on current cash flows, we also run the model suggested by Wysocki (2004):

$$\Delta WC_{it} = \alpha_0 + \alpha_1 OCF_{it} \quad (4b)$$

A relatively large R^2 of model 4a compared to model 4b reflects high earnings quality (adjusting for the potential effect of income smoothing). An overview of all specified attributes is provided in Table 1.

⁵ Note that we do not apply the measure most often used in accounting research to capture size – total assets. Our reason is that total assets are largely determined by the standards, which might significantly bias our results. We did consider other size measures, such as market capitalization and number of shares, and obtained similar results.

4. Sample selection

To perform this exploratory study, we selected a sample of German New Market firms. According to the listing requirements of this equity market, firms are obliged to report financial statements that are either IFRS or U.S. GAAP compliant. Selecting firms that are listed on the same market exchange offers the advantage that institutional factors (like market structure and organization) are constant across all sample firms.

In particular, we selected firms with an IPO date from 1997 through 1999. We identified 184 IPOs. To further ensure a minimum time period for performing robust tests, we single out only those firms that were continuously traded between 2001 and the beginning of 2003, leaving us with 168 firms. For these firms, we checked the Thomson Worldscope database, which offers capital market data as well as financial statement data. A number of firms were dropped either because they are not included in the database (15) or because the financial information is incomplete (8). For the remaining firms, we also collected hardcopy versions of their financial statements, readily downloadable from the New Market website. We used these reports to check both the firm's identity and the conformity of key accounting data between the New Market information and the Worldscope database. Ten observations were deleted due to inconclusive results on this test. Two firms in the financial sector were eliminated because of their very specific character. And, four firms that are cross-listed on NASDAQ or NYSE were dropped, since the quality of those statements might be different due to SEC requirements following (Lang et al., 2003; Lang et al., 2006).

On all 129 remaining firms, we retrieved data from the Worldscope database. Financial statement data, like earnings, book value of equity and operational cash flows, were collected on an annual basis for the period 2000–2002. Price data at several points in time during that same period were also gathered. As a result, we obtained 325 firm year observations. Consistent with Collins et al. (1999) and Brown, Lo, and Lys (1999), we required each observation to have a positive book value of equity, which resulted in dropping seven firm-year observations. Subsequently, observations with missing price data were dropped and observations falling in the top or bottom 1% of some of the variables

Table 1
Overview of attribute metrics

Attribute	Model specification
Value relevance	Model 1A $RET_{i,t} = \alpha_0 + \alpha_1(X_{i,t}/P_{i,t-1}) + \alpha_2DX + \alpha_3(X_{i,t}/P_{i,t-1}) * DX$
	Model 1B $P_{i,t} = \gamma_0 + \gamma_1 X_{i,t} + \gamma_2 DX + \gamma_3 X_{i,t} * DX + \gamma_4 BV_{i,t}$
Timeliness	Model 2 $X_{i,t} = \beta_0 + \beta_1 RET_{i,t} + \beta_2 DR + \beta_3 RET_{i,t} * DR$
Predictability	Model 3A $X_{i,t} = \gamma_0 + \gamma_1 X_{i,t-1} + \gamma_2 X_{i,t-2}$
	Model 3B $OCF_{i,t} = \gamma_0 + \gamma_1 X_{i,t-1} + \gamma_2 X_{i,t-2}$
Accruals Quality	Model 4A $\Delta WC_{i,t} = \gamma_0 + \gamma_1 OCF_{i,t-1} + \gamma_2 OCF_{i,t-2} + \gamma_3 OCF_{i,t-3}$
	Model 4B $\Delta WC_{i,t} = \alpha_0 + \alpha_1 OCF_{i,t}$

where $RET_{i,t}$ is the market-adjusted return, $X_{i,t}$ is earnings per share, $P_{i,t}$ is the security price 3 months after fiscal year end, $BV_{i,t}$ is the book value of equity at the beginning of the period t , DX (DR) is a dummy equal to 1 when earnings (returns) are negative and 0 otherwise, $OCF_{i,t}$ is the operating cash flow for firm i in fiscal year t and $\Delta WC_{i,t}$ is the change in non-cash working capital from year $t-1$ to t . All variables used in model 3a, 3b, 4a and 4b are scaled by total sales in year t .

used later on in the multivariate model (such as opening price-deflated earnings) were further excluded to reduce the effect of outliers on the regression results. The final sample includes 313 firm-year-observations spread over 124 firms.

5. Results

To obtain comparability across our different metrics, we limit our analysis to investigating the quality of year 2000, 2001, and 2002 accounting data. The sample period is restricted because the evaluation of some of the above earnings models not only requires data in that specific year, but also data from the previous and following year. Since the sample firms have IPO dates from 1997 until the end of 1999, collecting comparable price data on all sample firms can only begin at the end of 1999 (or beginning 2000). By necessity, value-relevance models can only start with the reflection of year 2000 accounting information captured in returns over the year 2000. Also, due to a restructuring of the German New Market⁶ and changing standards' requirements, the data collection ended with 2002 accounting data. Before discussing the results, some descriptive statistics are given in the following section.

5.1. Descriptive statistics

The sample consists of 313 firm-year observations, covering the period 2000–2003 and collected from 124 different companies (see Table 2, Panel A). The number of observations per accounting period is almost equally distributed, ranging from 103 to 107 observations. The vast majority of the selected sample firms are incorporated in Germany, had an IPO on the New Market during 1999, and their activities typically consist of computer or technology-oriented businesses (see Table 2, panels B, C, and D, respectively). Firms listed on the New Market are obliged to report either according to IFRS or according to U.S. GAAP. Overall, there is a slight preference for IFRS (164 versus 149).

Table 3 provides some more descriptive statistics on accounting and capital market information. First, the stock market on which the sample firms are traded is characterized by an overall downward trend: on average, prices per share melt down from €24.03 at the end of 2000 to €3.37 in 2002. The annual returns, furthermore, show that most of the loss is incurred during 2001 (−15%), while 2002 returns already suggest some recovery (+16%). Second, the bad economic environment in which these firms operate is also reflected in their accounting information. Firms, on average, end with a negative earnings number (Earnings Per Share are equal to € 0.97, € −1.31, and € −1.16, respectively). Shareholders' equity is also cut back during this period, as it drops from €7.61 per share in 2000 to €3.79 per share in 2002.

⁶ The German New Market, or the high-tech and innovative market segment of the Deutsche Borse, was closed down on 5 June 2003. All former companies from the Neuer Market segment were migrated into either the Prime Standard or the General Standard, where other reporting requirements were in force.

At this time, there is a body of literature on country effects in applying IFRS (e.g., Ding et al., 2006; Hope et al., 2006; Renders & Gaeremynck, 2006). However, given the relatively low number of non-German firms in our sample, we do not explore the country effect.

Table 2

General descriptives on observations and sample firms

	Full sample	IFRS	US GAAP
<i>Panel A: General sample distribution (firm year observations)</i>			
2000	103	57	46
2001	107	55	52
2002	103	52	51
Pooled	313	164	149
<i>Panel B: Distribution according to the country of origin (sample firms)</i>			
Austria	6	5	1
Germany	110	61	49
Netherlands	3	1	2
Switzerland	2	1	1
Israel	3	0	3
	124	68	56
<i>Panel C: Distribution according to date of first listing (sample firms)</i>			
During 1997	7	4	3
During 1998	30	16	14
During 1999	87	48	39
	124	68	56
<i>Panel D: Distribution across industry (sample firms)^a</i>			
Technology	28	15	13
Biotechnology	6	2	4
Software	21	8	7
Internet	19	14	11
Media & entertainment	13	10	3
Telecommunications	7	2	5
IT services	19	11	8
Medical technology & healthcare	3	1	2
Industry & industrial services	8	5	3
	124	68	56

^a This classification is based on the New Market's indices.

The evolution in the total assets of our sample firms is remarkable. While we expect these firms to expand their asset pool at a rather high rate (since the New Market is aimed at high-growth firms), we notice instead that the firms seem to abandon their expansion strategy and even divest, with an average drop in total assets of €102 million in 2001 and €15 million in 2002. Overall, however, the firms become operationally better, as evidenced by the increase in operating cash flow (€–5,252,000 in 2000 to €1,511,000 and even €6,818,000 in 2002). Looking at the working-capital accruals, and combined with the changes in earnings, these results suggest that accruals and thus accounting decisions are of considerable influence.

From panel B of Table 3, we further conclude that the market, in general, does not attach significantly different prices to U.S. GAAP and IFRS firms ($p=0.5035$). Note that the market did price the U.S. GAAP-compliant companies significantly higher than their IFRS counterparts in 2000 (i.e., €32.07 compared to €17.54; $p=0.0369$). However, from 2001 onwards, after some large scale U.S. financial scandals, the market no longer priced these investments differently (e.g., €10.12 versus €6.70; $p=0.5310$). The reported earnings

Table 3
Descriptive accounting and capital market information

	Panel A: Full sample				Panel B: IIPS firms compared to US GAAP firms			
	Mean		SD		IIPS		US GAAP	
	Mean	Median	SD		Mean	SD	Mean	SD
<i>Capital market information</i>								
Market price								
2000	24.03	1.40	5.95		1.54		32.97	55.56
2001	8.86	5.10	6.98		6.70		10.17	18.87
2002	8.87	1.99	8.16		3.03	4.62	8.11	18.81
Pooled	11.87	4.75	10.86		9.00	5.16	14.40	34.51
Market-adjusted returns (5m)								
2000	0.2197	0.1063	0.4083		0.6696	0.4796	0.1631	0.3713
2001	0.1543	0.2890	0.4147		0.6438	0.4192	0.13	0.4157
2002	0.1611	0.0306	0.4076		0.1762	0.3746	0.097	0.4567
Pooled	0.1754	0.0176	0.4135		0.4635	0.4437	0.1334	0.3733
<i>Accounting information (m)</i>								
Earnings per share								
2000	0.99	0.08	3.79		0.15	1.00	2.27	6.2145
2001	1.17	0.67	3.99		1.17	3.71	1.48	6.4876
2002	1.16	0.37	3.70		1.57	9.3	1.99	10.182
Pooled	1.11	0.37	3.78		1.08	7.1	1.6	6.9765
Shareholder equity (m)								
2000	7.61	3.63	9.09		8.39	0.163	6.88	9.3199
2001	8.54	4.37	6.96		6.87	3.3	5.3	9.3346
2002	8.79	3.88	8.87		4.89	1.6	3.3	6.1180
Pooled	8.35	4.28	8.00		6.74	3.14	5.1	9.1631
Total assets (m)								
2000	11.6669	5.001	9.85145		6.19	0.250944	13.408	10.776
2001	11.5604	3.9189	14.3		6.625	11.35	13.83	9.355
2002	10.995	5.006	14.188		12.634	10.696	13.1003	10.845
Pooled	11.3731	4.3734	12.511		7.6776	6.793	13.83	10.703
Operating liabilities (m)								
2000	8.382	1.144	3.187		3.36	4.636	0.699	9.7119
2001	1.81	1.81	1.976		3.35	11.1	3.0	6.677
2002	6.815	8.687	13.00		8.0	4.6	6.88	6.135
Pooled	5.52	5.364	8.71		7.1	10.4	5.1	6.107
Working capital (m)								
2000	3.34	2.446	5.162		6.16	35.1	5.29	9.145
2001	5.86	8.9	24.68		3.4	6.5	3.196	3.146
2002	9.04	3.03	10.18		3.1	10.4	3.69	6.1935
Pooled	6.08	4.1	14.36		7.6	8.5	4.06	6.085

* A variance ratio test is applied to compare the variance of the two distributions. ** p-value is less than 0.01.

number is, in general, not dependent on the applied accounting standards (€–1.16 compared to € 1.18). In addition, and consistent with prior research, our results also suggest that firms choosing U.S. GAAP, on average, report lower equity numbers per share (e.g., €5.30 versus €6.16 for the pooled sample), and in consequence also lower total assets (e.g., €118 million versus €161 million). Although the pattern is present in nearly all years, this difference between IFRS and U.S. GAAP is not significant.

5.2. Multivariate models

Differences between IFRS and U.S. GAAP earnings with regard to the four attributes we defined are reflected in (differences in) the models' R^2 -squared between the IFRS sample and the U.S. GAAP sample. Since we are analyzing firm-year observations, we also control for dependence in the error terms through the Rogers' procedure (Petersen, 2006; Rogers, 1993).⁵ Results are presented in Table 4. As shown in the table, we estimate cross-sectional regressions for the pooled sample, since pooling offers the advantage of increased sample size, hence, increasing the power of the Cramer test (e.g., Baringhaus & Franz, 2004).

5.2.1. Value relevance

First, running the returns earnings model, we obtain an R^2 of 16.33% for the IFRS sample and 28.36% for the U.S. GAAP sample, in line with other value-relevance studies performed during the 1990s (see, for example, Brown et al., 1999; Collins et al., 1997). Applying the Cramer test statistic, we find only marginal evidence ($t=1.57$) of U.S. GAAP earnings explaining more variance in the share-value evolution (that is, assuming that prices are good indicators of a share's value) than IFRS.

Based on the alternative-valuation model, where we control for some of the suggested misspecification in the returns earnings model, we find no significant difference between the two sets. Overall, neither set of standards makes accounting information more or less value relevant than the other. The explanatory power of the estimated models is higher than for model 1A (R^2 of 37.53% for IFRS versus 32.54% for U.S. GAAP; $z=-0.63$), indicating that (book value of) equity under the two sets of standards adds significantly to the explanatory power of earnings (with estimated-parameter statistics of, respectively, 6.24 and 3.25). In sum, these results seem to suggest that earnings stated according to IFRS capture approximately as much value-relevant information as U.S. earnings numbers, and vice versa.

5.2.2. Timeliness

In model 2, we measure timeliness of accounting data and use returns as an indicator of firm-specific news. By applying market-adjusted returns, we further control for any other, market or economy-wide, information reaching the investor public. Consistent with prior studies (e.g., Raonic et al., 2004), we find that the overall power of the timeliness model remains relatively low and IFRS seems to be as timely as U.S. GAAP in reflecting news (R^2 of 2.72 compared to 5.49; $z=-0.59$). In sum, this seems to suggest that accounting

⁵ While this leads to unbiased coefficient estimates, it does not change our metric of interest (the model's R^2 compared to OLS estimation).

Table 4
Multivariate results

HRS (N = 164)	US GAAP (N = 149)									
	z_0	z_1	z_2	z_3	z_4	z_5	z_6	z_7	z_8	z_9
Model 1a	0.2011 (2.09)**	3.2820 (1.20)	0.2623 (2.46)**	3.2729 (1.20)		0.1505 (2.07)**	2.9909 (4.19)**	0.2227 (3.74)**	0.2836 (19.14)**	1.57**
Model 1b	4.8641 (2.79)**	13.0484 (2.93)**	1.7849 (0.99)	12.5344 (2.79)**	0.3401 (6.24)**	5.9289 (3.03)**	8.1694 (2.54)**	3.0263 (1.35)	0.3254 (17.37)**	0.63
Model 2	0.2026 (3.16)**	0.1422 (2.65)**	0.0202 (0.24)	0.1317 (1.59)		0.0994 (2.34)**	0.0420 (1.31)	0.2087 (2.08)**	0.0549 (1.23)	0.89
Model 3a	0.1370 (3.57)**	0.3527 (1.79)*	0.1548 (0.98)			0.0937 (2.42)**	0.3693 (2.40)**	0.0105 (0.20)	0.4508 (62.14)**	3.55**
Model 3b	0.0499 (2.49)**	0.0827 (0.96)	0.1593 (2.16)**			0.0380 (1.72)*	0.1689 (1.52)	0.0011 (0.02)	0.3903 (46.74)**	4.70**
Model 4a	-0.0006 (0.04)	0.0907 (0.51)	0.1684 (0.73)	0.3820 (1.85)*		0.0298 (1.99)*	0.1499 (2.52)**	0.1974 (1.82)*	0.1323 (7.37)**	0.20
Model 4b	-0.0228 (1.19)	-0.2607 (1.28)				0.0287 (1.91)*	0.0249 (0.47)		0.0058 (1.15)	0.89

where
 model 1A: $RF_t = z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

model 1B: $P_t = z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

model 2: $X_t = P_t + z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

model 3a: $X_t = z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

model 3b: $OCF_t = z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

model 4A: $\Delta WC_t = z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

model 4B: $\Delta WC_t = z_0 + z_1 \Delta X_{t-1} + z_2 \Delta X_{t-2} + z_3 \Delta X_{t-3} + z_4 \Delta X_{t-4} + z_5 \Delta X_{t-5} + z_6 \Delta X_{t-6} + z_7 \Delta X_{t-7} + z_8 \Delta X_{t-8} + z_9 \Delta X_{t-9}$

Note: *t*-statistics on the parameters are presented between () while the overall model *s*-*F*-test is mentioned between []. *, **, *p*-value = 10, 05 respectively.

information in itself, whether it is stated according to IFRS or U.S. GAAP, is not very timely for the sample firms at hand.

5.2.3. Predictability

As discussed in the models section, predictability can be measured by running an autoregressive earnings model and evaluating the model's R -square. The results we obtained on the two samples are presented in Table 4, model 3a. In general, our results indicate that U.S. GAAP data better predict future performance than IFRS data (R^2 of 45.98% compared to 19.38%). The difference is significant at the 5% level ($z=3.55$). The results on the Dechow, Kothari, and Watts (1998) model provide further support for the superiority of U.S. GAAP earnings. We clearly discriminate between the predictive ability of U.S. GAAP and IFRS information (R^2 of 39.03% respectively 7.12%; $z=4.70$).

5.2.4. Accrual quality

Finally, the results with regard to accruals quality are reported. These results suggest that the quality of accounting accruals does not significantly differ depending on which accounting standards are applied. The Dechow & Dichev measure results in R -squares of 13.23% for U.S. GAAP observations and 11.87% for IFRS observations ($z=0.20$). In an attempt to capture the degree of (working capital) income smoothing, we run working-capital accruals only on the current operating cash flow (model 4b) and we find that both sets of standards are associated with some income smoothing. However, in general, there is no significant difference between IFRS and U.S. GAAP smoothing behavior (R^2 of 3.88% versus 0.78%; $t=0.89$). Consistent with Wysocki (2004), we subtract the (adjusted) R -square of model 4b from the R -square of model 4a to control for any current-year income-smoothing effects. Applying this procedure to our data, we find further evidence that there are no significant differences between the quality of IFRS and U.S. GAAP accruals (adjusted R^2 differences of 6.93% on the pooled IFRS sample compared to 11.33% on the U.S. GAAP observations; $t=0.71$ not tabulated).

5.3. Robustness tests

In this section, we test the sensitivity of our results to other specifications. First, we introduce a quality enforcer into our analysis. Based on year 2000 annual reports, Glaum and Street (2003) found that although the average compliance level is significantly lower for companies that apply IFRS as compared to companies applying U.S. GAAP, it is also positively associated with firms being audited by Big 5 auditing firms. Acknowledging the potential correcting role of these higher quality Big 5 auditors (e.g., Street & Gray, 2002; Van Tendeloo & Vanstraelen, 2005), we additionally ran the models on the Big 5 subsample only (N=207). Interestingly, there are more Big5-audited firms in the U.S. GAAP sample than in the IFRS subsample. As shown in Table 5, U.S. GAAP earnings remain better predictors of future company performance than IFRS earnings, while the two regimes are comparable on all other attributes. Moreover, the marginal significance on model 1A reported in Table 4 is no longer present in this analysis.

Second, prior research on accounting-regime choice documents that firms do not randomly choose their accounting regime, but instead are driven by certain firm

characteristics (e.g., Asbaugh, 2001; Cuijpers & Buijink, 2005; Tarca, 2004; Van der Meulen et al., 2005). As a result, it is unclear whether the observed attribute patterns are due to the applied accounting standards or whether they are associated with underlying firm characteristics. To test this argument, we first split the full sample according to a number of firm characteristics and then reran all regression models (for the IFRS and U.S. GAAP subsample).¹⁹ The splits are based on (median) firm size (measured by total assets) and leverage (as long-term debt over equity) and are reported in Table 6. In general, the U.S. GAAP superiority on predictive ability is further confirmed (e.g., $z=12.67$ and 5.13 for model 3a respectively 3b for large firms, panel A). For large and highly levered firms, we furthermore find that the market values U.S. GAAP earnings more than IFRS earnings (model 1a, $z=-1.84$ respectively 2.15). However, this result disappears when book values are taken into account (model 1b, $z=-0.14$ respectively 1.21), suggesting that the balance sheet for IFRS firms contains valuable information.¹⁰

Finally, and in addition to the R^2 comparison, we also used an alternative methodological approach (not further tabulated). We estimated one regression model based on all 313 observations and introducing an indicator variable (STAND) for either IFRS or U.S. GAAP adopters. The coefficient on STAND represents the intercept shift between IFRS and U.S. GAAP. We tested the interaction of each independent variable in the respective models with STAND, and find significant coefficients on the interaction terms (representing the slope shifts between the two standard regimes) in the predictability models (e.g., p -value of 0.0125 and 0.0818 on interacting last year's earnings and this year's earnings with STAND variable in model 3b). This is consistent with the results we report earlier in the paper.

6. Summary

In this study we report empirical evidence about attribute differences between U.S. GAAP and IFRS earnings for a sample of new-economy firms in a period of economic downturn. We test two market-based earnings attributes, i.e., value relevance and timeliness, as well as two accounting-based earnings attributes, i.e., predictability and accrual quality. Our results indicate that U.S. GAAP and IFRS only differ with regard to predictability. However, this difference in predictability between U.S. GAAP and IFRS does not appear to be fully valued by investors as no significant and consistent differences between the two standards are found for the value-relevance attributes. The latter suggests that some of the (remaining) technical issues underlying IFRS/U.S. GAAP differences may be too complex to be fully captured by the investor public.

As a caveat to this study, we acknowledge that our results may not be fully representative for the average IFRS/U.S. GAAP adopter. While most (U.S.-based) studies focus on the average firm captured in large data sets, our study addresses a specific sample of high-growth firms in a period of economic downturn. Although this has implications for the

We also ran a two-stage Heckman procedure (Heckman, 1974) and concluded there was no significant selection bias. However, we preferred the current approach for two reasons: to keep the R^2 comparison across models/samples possible, and to control for the impact of firm characteristics on the regression variables.

¹⁹ Note however that some models are estimated on a rather small sample, thereby the Cramer test might not be fully representative

Table 6
Multivariate results controlling for firm characteristics

Panel A: Models' explanatory power when controlling for firm size						
	Small firms			Large firms		
	IFRS (N= 81)	US GAAP (N= 76)	z-statistic	IFRS (N= 83)	US GAAP (N=73)	z-statistic
Model 1a	0.1989 [6.37]**	0.2492 [7.97]**	0.46	0.1537 [4.78]**	0.3519 [12.49]**	1.84**
Model 1b	0.3078 [7.89]**	0.1737 [3.68]**	1.22	0.4200 [14.12]**	0.4343 [13.05]**	0.14
Model 2	0.0393 [1.05]	0.0403 [1.01]	0.01	0.0526 [1.46]	0.1212 [3.17]**	0.78
Model 3a	0.3634 [22.26]**	0.6645 [72.28]**	3.27**	0.0025 [0.10]	0.7079 [84.83]**	12.67**
Model 3b	0.0767 [3.24]**	0.4357 [28.18]**	3.78**	0.1431 [6.68]**	0.6108 [54.92]**	5.13**
Model 4a	0.1385 0.1045 [4.13]**	0.2716 0.2408 [8.95]**	1.25	0.2255 0.1965 [7.67]**	0.1563 0.1180 [1.29]	0.63
Model 4b	0.0139 0.0012 [1.11]	0.0152 0.0015 [1.14]	0.03	0.0634 0.0519 [5.48]**	0.0029 -0.0108 [0.20]	1.07

Panel B: Models' explanatory power when controlling for leverage

	Less levered firms			Highly levered firms		
	IFRS (N=64)	US GAAP (N= 93)	z-statistic	IFRS (N= 100)	US GAAP (N= 56)	z-statistic
Model 1a	0.2627 [7.12]**	0.3146 [13.62]**	0.46	0.1364 [5.05]**	0.3742 [10.36]**	2.15**
Model 1b	0.5006 [14.03]**	0.3834 [13.68]**	1.13	0.2802 [9.15]**	0.4164 [9.10]**	1.21
Model 2	0.1201 [2.73]**	0.0910 [2.97]**	0.30	0.0309 [1.02]	0.0710 [1.32]	0.49
Model 3a	0.4607 [38.44]**	0.6226 [50.32]**	1.80**	0.0218 [1.08]	0.5566 [33.27]**	6.58**
Model 3b	0.2707 [11.32]**	0.4302 [33.97]**	1.43	0.0691 [3.60]**	0.2707 [9.83]**	1.90**
Model 4a	0.1982 0.1582 [4.95]**	0.2770 0.2526 [11.37]**	0.70	0.1761 0.1504 [6.84]**	0.2800 0.2384 [6.74]**	0.90
Model 4b	0.0738 0.0588 [4.94]**	0.0297 0.0191 [2.79]**	0.61	0.0207 0.0107 [2.07]	0.1108 0.0944 [6.73]**	1.08

where
model 1A: $RET_{i,t3} = \alpha_0 + \alpha_1 (X_{it}/P_{i,t-1}) + \alpha_2 DX + \alpha_3 (X_{it}/P_{i,t-1}) * DX$
model 1B: $P_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 DX + \alpha_3 X_{it} * DX + \alpha_5 BV_{i,t-1}$
model 2: $X_{it}/P_{i,t-1} = \alpha_0 + \alpha_1 RET_{it} + \alpha_2 DR + \alpha_3 RET_{it} * DR$
model 3a: $X_{it} = \alpha_0 + \alpha_1 X_{i,t-1} + \alpha_2 X_{i,t-1}$
model 3B: $OCF_{i,t+1} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 X_{i,t-1}$
model 4A: $\Delta WC_{it} = \alpha_0 + \alpha_1 OCF_{i,t-1} + \alpha_2 OCF_{it} + \alpha_3 OCF_{i,t+1}$
model 4B: $\Delta WC_{it} = \alpha_0 + \alpha_1 OCF_{it}$

Note: T-statistics on the parameters are presented between () while the overall model's F-test is mentioned between []; *, **=.05 p-value<.10, respectively. Adjusted R² are presented in italics.

validity of our results to other firms and other time periods, it yields insights into the relative performance of accounting regimes for firms in financial difficulties and firms that have considerable amounts of intangible assets.

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Discussion

Discussion of “Attribute differences between U.S. GAAP and IFRS earnings: An exploratory study”

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1. Introduction

Using firms listed on the German Neuer Markt, Van der Meulen, Gaeremynck, and Willekens (henceforth MGW) investigate whether there are significant difference in four attributes of earnings between firms that apply U.S. GAAP and firms that apply IFRS (or IAS). In my opinion, this study provides a timely investigation of an issue of considerable interest to both regulators and academics. Currently about 100 countries either require or allow the use of IFRS for their domestic publicly listed corporations. In the near future, we will likely only have two accounting standards worldwide: IFRS and U.S. GAAP.¹ Given the adoption of IFRS around the world and the relative lack of evidence on effects of such adoption, the authors do not have to try hard to motivate their study.

MGW have made several improvements to the paper following their presentation and my discussion of their paper at the *International Journal of Accounting* Conference in Paris. Consequently, my discussion here will be relatively brief and will focus on a few selected issues.

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¹ Whether such a “convergence” to one or two accounting standards is optimal or not is hard to say. It is my feeling that the decision to require IFRS – and thus abolish domestic GAAPs – around the world has been mostly based on “faith” rather than on solid evidence suggesting an overall gain to society (see also Ball, 2006).

2. Relation to literature

In my opinion, MGW complement the extant literature on differences between IFRS and U.S. GAAP.² That is, there are several prior studies that examine the quality of financial reporting across countries. Similarly, there are prior studies that focus on the German market but which either use small sample sizes or focus on information asymmetry outcomes rather than earnings attributes. Since quite a few studies examine IAS versus U.S. GAAP, the main contribution of this study likely lies in its focus on one market, Neuer Markt, as well as its investigation of several (not just one or two) earnings attributes.³ Focusing on one market is a strength because it holds many institutional factors constant (see, however, my comments below regarding differential enforcement). On the other hand, it also significantly limits the sample size (which, as explained below, turns out to be important in this setting), and limits the generalizability of results.⁴

3. Use of R^2 as a test metric and the Cramer test

At the conference, I raised the question of *why* the authors have chosen to focus on differences in R^2 's between two samples of firms. In my opinion, this choice has few (if any) advantages and several important disadvantages. Suffice to say that it is very difficult to compare R^2 across different groups of firms (which explains why we do not see such tests often in research papers). The authors do not provide any discussion of why they have made this choice. An alternative would be to instead focus on differences in coefficient estimates. Using such an approach, they could pool all observations and easily test for differences between the two groups using interaction terms.⁵

Similarly, even ignoring the inherent difficulties involved in comparing R^2 's across samples, the Cramer test used for testing differences in R^2 between samples is an unusually *weak* test metric. In particular, the Cramer test is extremely sensitive to the number of observations included in the tests. This fact is important for the current paper because MGW want to be able to conclude that there “are no significant differences” between the

² In their literature review, MGW discuss research on 20F reconciliations at some length. Such research is of relevance to regulators (i.e., the SEC), but the limitation of these studies is that they only examine firms already listed, whereas regulators may care even more about foreign firms that are not currently listed on the domestic exchange. In addition, the reconciliation stream of literature tends to focus on incremental value relevance (or information content, depending on the type of study) of additional, required U.S. GAAP disclosures. Such research does not directly address which GAAP system is “best.” Instead, it tests whether there is any *additional information* conveyed in having extra information disclosed (a subtle but important difference often overlooked in the literature).

Readers should note that there are other papers that investigate differences between IAS and U.S. GAAP using German firms. For example, Bartov, Goldberg, and Kim (2005) examine value relevance differences, Van Lendeloo and Vanstraelen (2005) study earnings management differences (i.e., “abnormal accruals” differences), and Leuz (2003) focuses on differences in bid-ask spreads and trading volume.

³ In addition, the sample period is marked by declining firm performance. “Value relevance” tests do not perform particularly well during such periods.

At the conference I made several specific comments on the four earnings attributes. For example, I do not understand why the authors use the R^2 from the Dechow and Dichev model when other studies use the standard deviation of the residuals from this model. Furthermore, I am not quite sure how different the test of “timeliness” is from the test of “value relevance.”

use of IFRS and U.S. GAAP. A quick perusal of the empirical results reveals a number of differences in R^2 that seem *large in magnitude* but which show up as either statistically insignificant or only marginally significant based on the Cramer statistic.⁶ For example, in the first regression results reported (Model 1a in Table 4), the R^2 for the U.S. GAAP sample is 12 percentage points higher than for the IFRS sample (0.2836 compared with 0.1633). However, the reported results show only very modest (if any) significance, with a reported z statistic of 1.57. To highlight how sensitive this statistic is to the sample size, I recomputed the z statistic after artificially increasing the sample size by 200. The resulting z statistic is 2.36, which is highly significant. As another example, in panel A of Table 6, the R^2 s for large firms in Model 2 using IFRS and U.S. GAAP are 0.0526 and 0.1212, respectively. Although the latter is 2.3 times larger than the former, the difference is reported as not being significant according to the Cramer test. Similarly, in the last row of panel A of Table 6, the R^2 for U.S. GAAP is almost 22 times greater than for IFRS. Still, the difference is deemed insignificant. Such results are indicative of a weak test.

4. GAAP differences

Given that MGW focus on properties of accounting earnings, the paper would benefit from a richer discussion of the actual accounting differences between IFRS and U.S. GAAP during the sample period. Such a discussion would be interesting for several reasons. First of all, some readers may not know if there were any material GAAP differences and if so, which they were. Second, if the GAAP differences were small during the sample period, one would expect differences between U.S. GAAP and IFRS to be (even) smaller today than they were back then. Finally, knowing more about specific accounting differences would help readers interpret the reported results. In particular, are the results due to accounting differences or to differences in firm characteristics? For example, MGW find that U.S. GAAP firms have more predictable earnings.⁷ A reader would like to know which accounting differences are likely to cause such a result – or whether the difference in predictability is unrelated to the use of different accounting standards (i.e., explained by firm characteristics instead).

5. The potential for differential enforcement

One of the strengths of the study is that by focusing on one market, Neuer Markt, the authors are able to hold many institutional factors constant. However, it is not clear that *all* such factors are constant between the two sets of firms. One such important institutional factor is the enforcement of accounting standards. In practice, enforcement can be as important in explaining accounting outcomes as the standards themselves (e.g., Hope, 2003). Applied to the MGW setting, I am not entirely convinced that the auditing of IAS was as stringent as the auditing of U.S. GAAP financial statements.

⁶ In my conference discussion I provided several such examples, which presumably explains why the authors chose to present results of pooled regressions (rather than year-by-year regressions) in the published version.

⁷ A general issue in the literature is whether predictability is good or bad. That is, smoothing is considered “bad” but smooth earnings are considered “good.”

Generally speaking, prior research has found considerable evidence of noncompliance with IAS (e.g., Cairns, 1999). To me this is especially interesting given that IAS allowed wide latitude in accounting measurement and recognition, and IAS as applied in practice was often referred to as “IAS light.” More specifically, during the sample period there was no strong market regulator for the German market, and none of the authorities were responsible for checking the accuracy and completeness of the financial statements (d’Arcy, 2001; Glaum & Street, 2003). In fact, Glaum and Street (2003, 92) state the following regarding the collapse of the Neuer Markt: “ironically, the sharp downfall has been attributed in part to the low quality of accounting and disclosure.” Glaum and Street (2003) document that the level of GAAP compliance is significantly lower for IAS companies than for U.S. GAAP companies listed on the Neuer Markt, suggesting that IAS was applied less rigorously than U.S. GAAP.

I appreciate the fact that the authors have attempted to address the issue of differential enforcement I raised at the conference. Specifically, MGW report multivariate results excluding firms that are not audited by Big 5 audit firms. This is a nice test.⁸ However, Glaum and Street (2003) show that GAAP disclosure compliance is significantly higher for Neuer Markt U.S. GAAP firms than for Neuer Markt IAS firms, even after controlling for auditor type.

6. Differences in firm characteristics (other than auditor)

One of the main concerns with the study is that readers may not be convinced that reported results can be attributed to accounting differences (or lack of accounting differences) between IFRS and U.S. GAAP and not to the fact that we are dealing with two different sets of firms (i.e., omitted firm variables).

In the post conference version, MGW show results separately for small and large firms and for less and more levered firms. This is a useful addition to the paper. Nevertheless, it also highlights the weakness of the research design employed (which is a result of focusing on differences in R^2). Since the sample size likely is not large enough to use a matched sample design, a complementary (and efficient) test would be to add intercept controls for important firm characteristics (e.g., as in Van Tendeloo & Vanstraelen, 2005).

7. Conclusion

This is an interesting study that examines an issue of great importance to both practitioners and academics. It is an unresolved issue—whether there exists material differences in accounting outcomes between the two (main) remaining GAAP systems worldwide, IFRS and U.S. GAAP, and whether such differences (if they exist) have economic consequences. The article by Van der Meulen, Gaeremynck and Willekens will

⁸ Note that the R^2 for Model 3a (earnings predictability—the only test for which significant differences are found) in Table 5 is only 0.0363 as compared with 0.1938 in Table 4. This huge difference in explanatory power suggests that either “something else is going on” or that there is very significant noise in the estimation of these models.

provide motivation for future research on the economic consequences of IFRS implementation around the world.

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Reply

Attribute differences between U.S. GAAP and IFRS earnings: An exploratory study[☆]

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1. Introduction

We thank the discussant, Ole-Kristian Hope, and an anonymous reviewer for their constructive comments and suggestions. We use this opportunity to address the following topics that embrace their most important comments: potentially differential enforcement; the use of the R^2 as a test metric and the Cramer test; discussion of GAAP differences; and firm-characteristic controls.

2. Potential for differential enforcement

Glaum and Street (2003) find indeed that the average level of compliance with disclosure requirements on Germany's New Market is significantly lower for firms that apply IFRS than for companies applying U.S. GAAP. However, Glaum and Street also show that compliance is higher for firms audited by a Big 4 auditor, and that the difference between the two sets of standards also becomes smaller for such firms. Accordingly, we ran all four models on a subsample of firms audited by Big 4 auditors. Given the reduction in sample size and the implications for the Cramer estimation, we choose to report this as an additional analysis rather than in the paper's base results section.

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Next to auditor type, Glaum and Street also identify other factors that positively influence firms' compliance level with disclosure rules. These include being cross-listed on a U.S. exchange and the inclusion in the audit opinion of explicit references to the applied standards. We want to emphasize that both factors are indirectly controlled for in our study through our sample selection procedure. First, we excluded firms that are cross-listed on a U.S. exchange. We primarily motivate this decision by referring to prior evidence (Lang, Raedy, & Yetman, 2003) on differing time series properties of earnings for cross-listed (as opposed to non-cross-listed) firms. As mentioned above, Glaum and Street also favor a separate consideration of U.S. cross-listings. However, in their paper disclosure items are studied; this does not necessarily imply that compliance is equally "problematic" for measurement issues and bottom-line earnings (as concluded by Glaum and Street). Second, we identified firms as either IFRS or U.S. GAAP adopters by inspecting both the Notes section and the auditor's report. Only when both documents explicitly mentioned the adoption of the same standard, did we include the firm in our sample. Applying such selection criteria is likely to result in a more homogenous sample, where differences between IFRS and U.S. GAAP-compliance levels are probably less pronounced than in the sample used by Glaum and Street.

3. Use of the R^2 as a test metric and the Cramer test

Prior research has identified and modelled a number of accounting attributes, using various regression models. When estimating these models, researchers have typically focused on either the coefficient estimates (see for example studies in the ERC and persistence literature, but also Givoly & Hayn, 1992; Francis, Schipper, & Vincent, 2003) or on the model's R^2 (see for example Alford, Jones, Leftwich, & Zmijewski, 1993; Harris, Lang, & Moller, 1994; Joos & Lang, 1994; Pope & Rees, 1992). The focus critically depends on the study's purpose. For example, coefficients are typically studied when one is interested in the incremental explanatory value of one variable over and above other specified variables already in the model, while the R^2 captures the *overall* degree of association between the dependent variable and all independent variables. Likewise, Holthausen and Watts (2001) classify prior value relevance literature into incremental (or coefficient) and relative association (or R^2) studies, respectively.

In our exploratory study, we are interested in evaluating quality attributes of *overall* IFRS versus *overall* U.S. GAAP compliant accounting information. In the case of timeliness, for example, we are interested in the overall timeliness of earnings and less in the split up between timeliness towards good or bad news. Therefore, we choose the R^2 as a measure of reference. To test for differences between the two standards sets, we then estimated the models on both IFRS and U.S. GAAP information separately and compared the resulting R^2 . Prior research (for example, the reconciliation literature) applies a Vuong test to make statistically valid inferences. However, in our setting where firms *either* apply IFRS or U.S. GAAP, but not both, we need to additionally control for sample differences. Consistent with other empirical, accounting research in recent years (e.g., Ball, Kothari, & Robin, 2000; Ely & Pownall, 2002; Giner & Rees, 1999; Lang et al., 2003; Nwaeze, 1998; Harris et al., 1994), we apply the Cramer test (1987) and accordingly estimate the standard deviation of estimated R^2 's.

However, and as pointed out by Cramer himself, the discussant and in footnote 9 of our paper, the computations might not be robust for small samples. To accommodate for some of the deficiencies in the Cramer estimation, we also executed a bootstrap analysis. Bootstrapping is a relatively new, nonparametric approach to statistical inferences, and increasingly used in accounting research (e.g. Malliaropoulos, 1996; Goncharov, Werner, & Zimmerman, 2007). The approach allows for the construction of significance levels for a test statistic without a priori assumptions about the statistic's sampling distribution. The distribution itself is estimated by constructing an infinite or large amount of re-samples and using the within-sample variation in R^2 . The samples are taken randomly from the original sample and without replacement. As such, the bootstrap method helps to reduce the bias that typically originates from using a small sample. Performing a bootstrap with 300 re-sampling iterations on the Big 5 subsample, we obtained significant z -statistics of 2.33 and 1.83 on model 3a, 3b respectively. For all other models, the z -statistic was insignificant, ranging from 0.04 in model 4a to 0.53 in model 1b).

Notwithstanding our design choice, we do acknowledge that there may exist potential benefits from using the coefficients approach. For example, it might lead to interesting insights on the incremental effect of specific earnings components. In addition, such an analysis could further confirm the robustness of our R^2 results. Therefore, and as mentioned in the last paragraph in the results section, we pooled all observations, introduced a dichotomous variable to reflect the applied standards and interacted this variable with all explanatory variables. Significant differences between IFRS and U.S. GAAP are reflected

Table 1

Modelling predictive ability of past and present earnings using the coefficient approach and additionally controlling for some firm characteristics

$$\text{Model: } X_{i,t+1} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 X_{i,t-1} + \alpha_3 \text{STAND}_{i,t} + \alpha_4 \text{STAND}_{i,t} X_{i,t} + \alpha_5 \text{STAND}_{i,t} X_{i,t-1} + \alpha_6 \text{SIZE}_{i,t} + \alpha_7 \text{LEVERAGE}_{i,t} + \alpha_8 \text{B5}_{i,t} + \alpha_9 \text{MTOB}_{i,t}$$

coefficient	estimate	t-value	R-squared
α_0	-0.1775	-0.88	0.30**
α_1	0.0832	0.97	
α_2	-0.1593	-2.10**	
α_3	-0.0057	-0.20	
α_4	0.0845	0.60	
α_5	0.1580	1.75	
α_6	0.0212	1.17	
α_7	0.0062	1.20	
α_8	0.0051	0.16	
α_9	-0.0076	-1.53	

where X is earnings per share, STAND is an indicator variable equalling 1 when US GAAP is applied and 0 for IFRS, SIZE is the natural logarithm of total assets, LEVERAGE is long term debt over equity, B5 is an indicator variable equalling 1 when the firm engages a Big 5 auditor, MTOB is the market to book ratio, and i and t are indexes referring to firm i and year t respectively

in the significance of the interaction coefficient. As reported in the paper, the results from this analysis confirm the R^2 results: only in the predictive ability models do we find a significant difference ($t=1.79$; not further tabulated). Adding intercept controls for firm characteristics, as suggested by the discussant and the anonymous reviewer, does not significantly alter our results (see Table 1).

4. GAAP differences and firm-level controls

With regard to the GAAP differences between the two regimes under study, we agree with the discussant that our discussion section is rather concise. However, given the aim of this paper, being an exploratory research on earnings attributes, we feel that the focus should be on bottom-line reported earnings numbers and less on the standards and their wording. There are already ample discussion reports out there, edited by professionals at some of the most renown accounting firms, that document these differences at great length (e.g., KPMG). For the sample period we covered, we especially refer to the FASB's study (Bloomer, 1999) *The IASC-U.S. Comparison Project: A Report on the Similarities and Differences between IASC Standards and U.S. GAAP-second edition*. So instead of trying to complement those studies with yet another comparison, we prefer to cross-reference these studies in our paper.

To test the materiality of the differences, we point out that direct tests can only be performed on a sample of firms that report according to both standards sets. So far, the U.S. setting where foreign firms publish IFRS financial statements together with a reconciliation to U.S. GAAP is the only possible setting to make such computations. Street, Nichols, and Gray (2000) and Blanco and Osma (2003), for example, concluded on highly material reconciliation amounts (of about 20% of U.S. GAAP earnings). Blanco and Osma (2003) also document material differences in the period after the IASC's Core Standards Project (post 1998), but they also observe that the materiality is decreasing. However, also in this later period, reconciliation amounts seem to have an economic impact since trading volume reactions are registered around the reconciliation announcement. Nevertheless, this setting also introduces some less-desirable characteristics (e.g., differences in enforcement and in reporting incentives), which makes the results less applicable to our German New Market sample.

In an attempt to control for differences in company characteristics in the current setting, we performed multiple tests that all pointed in the same direction. First, we made subsamples of small/large and highly/less levered firms and reran the models. Second, we performed a two-stage Heckman procedure to control for differences in firm characteristics. Finally, we also added intercept controls on the firm level in the coefficient-approach models. To the extent that these are adequate controls, we conclude that the observed difference in predictive ability can be ascribed to the standards rather than to differences in firm characteristics between the IFRS and U.S. GAAP subsample.

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Stock performance and the mispricing of accruals[☆]

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Abstract

I investigate the relationship between contemporaneous stock-price performance and the persistence of accrued earnings, and its impact on the accrual anomaly. I find that, in a fiscal year, accrued earnings for stocks that have performed poorly are less persistent in predicting future earnings than accrued earnings for stocks that have performed moderately. I further find that a hedge-strategy based on accruals earns greater abnormal returns following bad-news years. The results are consistent with conservative accounting causing accrued earnings to be even less persistent in bad-news years and investors failing to efficiently price this differential in persistence.

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JEL classification: M41; G12; G14

Keywords: Conservative accounting; Accrual anomaly; Efficient market

1. Introduction

This study attempts to further our understanding of the “accrual anomaly.” Sloan (1996) separates corporate earnings into two components: accrued earnings and cash earnings, and shows that accrued earnings are less persistent than cash earnings in predicting one-year-

This paper is based on a chapter of my Ph.D. dissertation finished at the Haas School of Business of the University of California, Berkeley. I am grateful to my dissertation committee members Brett Trueman (chair), James Powell and Xiao-Jun Zhang for valuable guidance. Comments and suggestions from Bokhyeon Baik, John Briginshaw, Kevin Chen (the editor), David Tien, two anonymous referees, and seminar participants at Berkeley, Peking University, and the University of Hong Kong were very helpful. I also thank the National Natural Science Foundation of China for financial support in the revision stage of this paper (approval number 70532002).

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ahead earnings.¹ Furthermore, Sloan (1996) demonstrates that the market appears to overestimate the persistence of accrued earnings, and hence over-/under-prices stocks with large amounts of income-increasing/decreasing accruals. A hedge strategy that takes advantage of the mispricing nets almost a 10% size-adjusted return in the one-year-ahead period.

This study focuses on two questions. First, under what circumstances do accrued earnings have lower persistence in predicting future earnings? Second, do different levels of mispricing of accrued earnings occur hand in hand with different levels of persistence of accrued earnings?

Invoking accounting conservatism and its impact on (accrued) earnings, I argue that accrued earnings are less persistent when stocks perform poorly in a fiscal year, prompting firms to record accruals following conservative accounting principles. As a result, investors, failing to fully adjust to the differential persistence of accruals under these circumstances, misprice accrued earnings to a greater extent in years with bad stock price performances than in years when stock performance is moderate.

Empirical results largely support my predictions. I separate my sample firm-years into three news groups, based on stock performance of the sample firms in each fiscal year: a good-news group when stocks have performed well in a fiscal year; a bad-news group when stocks have performed poorly; and a neutral-news group when stock prices have not moved much. I show that (a) the persistence factor of accrued earnings (the coefficient on accruals in a regression of future earnings on current earnings components) for the bad-news group is 16% lower than that for the neutral-news group; and (b) the persistence factor of accrued earnings for the good-news group is only 5.3% lower than that for the neutral-news group. Furthermore, the differential persistence leads to a different level of mispricing. In the framework of the Mishkin test, investors overestimate the persistence of accrued earnings by 50.8% for the bad-news group, by 22.5% for the good-news group, and by 18.7% for the neutral-news group.

A hedge-portfolio strategy reveals that the mispricing is economically significant. In the Fama-French three-factor model regression, the one-year-ahead abnormal return to an accrual-based hedge strategy is 8.8% for the bad-news group, which is significantly higher than the 4.2% abnormal return for the neutral-news group. The one-year-ahead abnormal return to the good-news group, 5.8%, however, is not significantly higher than that of the neutral-news group.

The results in this study are consistent with the notion that persistence is an important aspect of the quality of accounting earnings (Richardson et al., 2005). In particular, when accrued earnings are preceded by abnormally poor stock performance, the persistence of accrued earnings is lower than that of other firms, and consequently, the mispricing of earnings is greater. The results in this study draw our attention, when we analyze financial statements, to the economic events that drive stock-price movement. Accounting numbers (e.g., earnings) are driven by economic events that drive stock prices at the same time. Thus, we should analyze accounting numbers in the same environment that produces them. In this regard, we contribute to the current literature on “accrual anomaly” by pinpointing situations where “accrual anomaly” tends to be more severe and we hope that further research will unravel the perplexing question of why “accrual anomaly” arises and persists.

¹ Throughout this paper, I define earnings persistence as the ability of current earnings, or components of current earnings, to predict one-year-ahead earnings. Sloan (1996), and later Richardson, Sloan, Soliman, and Tuna (2005) used this definition. Penman and Zhang (2002) used this concept in a similar fashion.

This paper is organized as follows. Section 2 reviews the “accrual anomaly” literature and motivates my study. Section 3 presents an empirical analysis of accrued earnings across the three news groups. Section 4 concludes.

2. Motivation

In the research on financial-statement analysis, researchers are very interested in how current (or past) earnings (or earnings components) aid in forecasting future earnings or cash flows, both of which are central inputs in accounting-valuation models.

Among others, Sloan (1996) shows that accrued earnings are less persistent than cash earnings in predicting future earnings, and presents evidence that investors seem to overestimate the persistence of accrued earnings and subsequently misprice stocks with large amounts of accrued earnings.

The Sloan (1996) results seem to have endured over time and been confirmed by others. In follow-up papers, researchers have been able to replicate Sloan’s results for different time periods and different definitions of accruals. In addition, these papers have identified some driving components of Sloan’s (1996) results and attempted to explain why accrual anomaly arises (Chan, Chan, Jegadeesh, & Lakonishok, 2006; Hribar, 2000; Thomas & Zhang, 2002; Xie, 2001).

However, the questions surrounding earnings accruals are still very perplexing. Further research is still warranted into the causes of the differential persistence of cash earnings versus accrued earnings and the reasons for the market’s failure to price accrued earnings correctly. The present study tries to add to the existing literature by examining accruals in the context of contemporaneous stock performance and accounting conservatism, and their impact on the generation of accruals.

How much contemporaneous return¹ news is incorporated in earnings is one factor in determining the persistence of accruals and subsequent mispricing of accruals. As is widely known, stock returns lead accounting earnings (e.g., Beaver, Lambert, & Morse, 1980). Value-relevant events drive stock-price movement faster than their economic impact flows through the financial-reporting system. Therefore, the extent to which current earnings incorporate the economic impact of these events (hereinafter referred to as return news) has implications for the persistence of current earnings and for the market’s forecast of future earnings.

At least two (mutually nonexclusive) reasons can affect how much contemporaneous return news current earnings incorporate. First, current GAAP accounting rules are inherently conservative. Accounting conservatism requires bad news to be recognized in current earnings faster and more completely than good news. That is, in the event of bad news, GAAP requires current accounting earnings to fully account for the implications of the event, not only for current cash flow, but also for future cash flows. In effect, this act brings future consequences to the present.

However, such a conservative tilt in recognition does not apply for good news. That is, current earnings do not recognize the implications for future cash flows of good news. The impact of good news only flows through earnings as it materializes in operation.

¹ By “contemporaneous” I mean that stock returns are measured during the 12 months of the same fiscal year for which accruals are measured.

Because the cash component of current earnings cannot be changed, management needs to use accruals to account for the early recognition of future cash-flow implications of bad-news events. This approach thus generates an additional amount of accrued-earnings information in a bad-news year.

Second, as Abarbanell and Lehavy (2003) argue, stock-price performance provides management with a strong incentive to manage earnings. These researchers argue that in a bad-news year, it is likely that the traditional earnings targets, such as outstanding analysts' consensus-earnings forecasts, zero profit, or earnings of the last period, will not be met. In this event, some managers tend to take a "big bath" to "clear the deck" for future years. The "big bath" is reflected in current earnings by large amounts of income-decreasing accruals. Thus, taking a "big bath" is consistent with accounting conservatism in the sense that they both incorporate bad news in current earnings faster and more completely than otherwise.

Once again, because managerial discretion over cash flow is very limited, to achieve the earnings-management objective, management has to act on accrued earnings.

In summary, both accounting conservatism and earnings management in response to stock performance cause additional amounts of accruals to be included in current earnings. The focus of this study is thus on the persistence of accrued earnings when stock performance is bad.³ Furthermore, I examine whether the accrual anomaly is stronger in bad-news years. That is, whether an accrual-based hedge strategy generates larger amounts of abnormal returns in bad-news years than otherwise.

I separate sample firm-years into three groups: a bad-news group (those firm-years in which stocks have performed poorly); a neutral-news group (those firm-years in which stock prices did not change much); and a good-news group (those firm-years in which stocks have performed well). I then use the neutral-news group as my benchmark to test whether accrued earnings in the bad-news group are less persistent than accrued earnings in the neutral-news group, and whether such differences in persistence lead to different levels of mispricing. Similarly, I also test the differences between the good-news group and the neutral-news group. However, I expect the difference to be small and less economically significant.

Following Sloan (1996), I conduct two analyses. The first is a Mishkin test that compares the *actual* persistence of earnings components with the *market-perceived* persistence. A significant difference would suggest market mispricing of those earnings components. More relevant to this study, I test whether there is a differential in the persistence of accrued earnings between the bad-news and the neutral-news group—that is, whether the persistence of accrued earnings in one group is larger or smaller than in the other group, and whether the market misprices this differential in persistence. The second test is a hedge-portfolio test that is complementary to the Mishkin test. It determines whether mispricing is economically significant.

In a study similar in spirit to my paper, Dopuch, Seethamraju, and Xu (2005) investigate the differential persistence of accruals between profit firms and loss firms. They find that

There is potentially another reason to explain the lower persistence of accrued earnings in the bad-news years and in the good-news years. Normally, very bad news or very good news does not recur often and so lacks persistence. As a result, accrued earnings in these years may also lack persistence, aside from what can be explained by accounting conservatism and earnings management. Accrued earnings in good-news years are less persistent than in neutral-news years. However, the magnitude of persistence differential is much smaller for the good-news/neutral-news comparison than for the bad-news/neutral-news comparison. In addition, the differential of persistence was not mispriced by investors.

accrued earnings are more persistent for profit firms than for loss firms and that only in profit firms accrued earnings are overpriced, while in loss firms accrued earnings are underpriced, albeit insignificantly.

Taken together, Dopuch et al. (2005) and this paper emphasize the importance of understanding the environments in which accruals are generated and how investors price accruals differently under different situations. These analyses lead to a sharp improvement in the detection of the mispricing of accruals.⁴

3. Data analysis

3.1. Variable measurement

I begin by defining the variables used in this study.

Following Sloan (1996), accruals are derived from successive balance sheets and income statements:

$$ACCR_t = (\Delta CA_t - \Delta CASH_t) - (\Delta CL_t - \Delta STD_t - \Delta TP_t) - DEP_t. \quad (1)$$

CA Current assets

CASH Cash or cash equivalents

CL Current liability

STD Debt included in current liabilities

TP Income tax payable

DEP Depreciation and amortization expenses

Δ Indicates change of a variable from year $t-1$ to year t .

Total earnings ($EARN_t$) are defined as operating income after depreciation, and, therefore, the cash flow component of earnings ($CASH_t$) is defined as the difference between total earnings and accruals:

$$CASH_t = EARN_t - ACCR_t. \quad (2)$$

$EARN$, $CASH$, and $ACCR$ are all deflated by average total assets.

To test market efficiency with regard to earnings, I compute one-year-ahead twelve-month buy-and-hold size-adjusted returns starting with the fifth month after fiscal-year-end t . The four-month lag is to make sure that the market has already learned the earnings information contained in the firms' annual financial reports.

$$ABRET_{t+1} = \prod_{i=1}^{12} (1 + RET(i)) - \prod_{i=1}^{12} (1 + SIZRET(i)). \quad (3)$$

$ABRET_{t+1}$ 12-month compounded size-adjusted returns in year $t+1$, starting from the fifth month after fiscal year end t .

$RET(i)$ Firm raw return in month i . Here the first month of the return accumulation period is the fifth month after fiscal year end t .

⁴ Thanks to the referee's comments, I realize it would be interesting to investigate the impact on accrual anomaly of the interaction between stock performance and earnings performance. I leave this to a later research project.

SIZRET(*i*) Return in month *i* on the size portfolio that the firm belongs to in year *t* + 1, the size portfolio is supplied by CRSP.

Following previous studies (e.g., Basu, 1997; Pope & Walker, 1999), I use a stock's raw annual return during fiscal-year *t* to measure the return news during the fiscal year:

$$\text{FRET}_t = \prod_{i=1}^{12} (1 + \text{RET}(i)) - 1. \quad (4)$$

RET(*i*): firm raw return in month *i*. Here the first month of the return-accumulation period is the first month of fiscal-year *t*.

The reason that I use raw return as a measure of news, instead of other metrics such as changes in analysts' consensus-earnings forecasts, is as follows. Raw return in a fiscal year is a measure of economic impact on a firm from value-relevant events having occurred to the firm or to the market as a whole during this period. News that are impounded in returns will factor into corporate earnings as the economic impacts materialize in the firm's operations. That is, return leads earnings. In Pope and Walker's (1999) model, accounting conservatism garbles the price-leading-earnings process by requiring fast recognition of bad-return news. Therefore, the property of the time-series of earnings is affected by how return news is incorporated in earnings in different situations. While all the above-cited studies focus on the implications of return news for total earnings, it is logical to believe that the implications have more to do with accrued earnings than with cash earnings because the latter cannot be as easily garbled in response to economic events and accounting rules. Therefore, I choose to use raw return as my measure of news.

3.2. Research design

Sloan (1996) developed two complementary tests to examine the persistence of earnings components and market mispricing. The present study utilizes these two tests with some modifications.

The first test employs the Mishkin test.⁵ Mishkin (1983) developed a framework to test the rational-expectation hypotheses in macroeconomics. Sloan (1996) introduced this test into accounting research to test whether the market efficiently prices accrued earnings and cash earnings.

The Mishkin test in this study is in the following form:

$$\text{EARN}_{t+1} = a_0 + a_1 \text{ID}_t + b_0 \text{CASH}_t + b_1 \text{CASH}_t * \text{ID}_t + c_0 \text{ACCR}_t + c_1 \text{ACCR}_t * \text{ID}_t + e \quad (5)$$

$$\text{ABRET}_{t+1} = \alpha + \beta^* (\text{EARN}_{t+1} - a_0 - a_1 \text{ID}_t - b_0^e \text{CASH}_t - b_1^e \text{CASH}_t * \text{ID}_t - c_0^e \text{ACCR}_t - c_1^e \text{ACCR}_t * \text{ID}_t). \quad (6)$$

- $EARN_{t+1}$ is operating earnings in year $t+1$,
 $ACCR_t$ is total accruals in year t ,
 $CASH_t$ is total cash earnings in year t ,
 $ABRET_{t+1}$ is size-adjusted buy-and-hold returns in the twelve months starting from the fifth month after fiscal-year-end t ,
 ID_t is a dummy variable that takes value “one” for bad-news/good-news firms and “zero” for neutral-news firms.
 A superscript e indicates market expectation.

The dummy variable, ID_t , indicates which news group a firm belongs to. Each year, I partition firms into three news groups. Firms whose $FRET_t$ is in the highest quintile in the annual cross-section are grouped into the good-news group, whereas those in the lowest quintile are grouped into the bad-news group. I classify firms in the three middle quintiles into one group, the neutral-news group. With this partitioning scheme, this study contrasts accrued earnings in the relatively extreme ends of the return-news spectrum with those in the middle.

In the analysis below, I discuss the Mishkin test using bad-news neutral-news groups. However, the same analysis applies to the comparison of good-news neutral-news groups.

Eq. (5) is the forecasting equation that determines the weights (hereafter referred to as the persistence factor) that should be assigned to earnings components in forecasting future earnings. b_0 and c_0 are the persistence factors for cash earnings and accrued earnings in the benchmark case, the neutral-news group; and $(b_0 + b_1)$ and $(c_0 + c_1)$ are the persistence factors for cash earnings and accrued earnings for the bad-news group. Our focus is on c_1 , which is the differential persistence factor (negative sign expected) for accruals in the bad-news group relative to the neutral-news group. If c_1 is significant, it tells us that there is a difference in the persistence of accrued earnings in the bad-news group versus the neutral-news group.

Eq. (6) is the pricing equation that estimates the weights that the market assigns to earnings components in forecasting future earnings and uses in valuation. Comparing c_0 and $(c_0 + c_1)$ in Eq. (5) with c_0^e and $(c_0^e + c_1^e)$ in Eq. (6) will tell us whether the market prices accrued earnings efficiently in both the neutral-news group and the bad-news group. In particular, comparing c_1 with c_1^e will tell us whether the market recognizes the differential in the persistence of accruals between the bad-news group and the neutral-news group and prices them efficiently.

Eqs. (5) and (6) are estimated jointly, using an iterative generalized non-linear least squared estimation procedure. To test whether the weight on an earnings component is the same between the forecasting equation and the pricing equation—that is, whether the market prices the earnings component efficiently—I calculated the following likelihood-ratio statistic:

$$2N\ln(SSR^c/SSR^u),$$

where: N is the number of observations in the sample;

\ln is natural logarithm operation;

SSR^c is the sum of squared residuals from the constrained regressions of the system;

SSR^u is the sum of squared residuals from the unconstrained regressions of the system.

This likelihood-ratio statistic is asymptotically $\chi^2(q)$ distributed under the null hypothesis that the market efficiently prices the earnings component with respect to its implications for future earnings, where q is the number of constraints imposed on estimating the system. I

reject efficient pricing of an earnings component if the likelihood-ratio statistic for it is sufficiently large.

The second test in this study is a hedge-portfolio analysis. An accrual-based hedge strategy takes advantage of the mispricing of accruals. It longs undervalued stocks (as predicted by the Mishkin test) and shorts overvalued stocks (as predicted by the Mishkin test) to earn abnormal trading profits when stock prices move back to intrinsic values. If the abnormal trading profits prove to be significant, the hedge-portfolio test supports the Mishkin test's conclusion on the market mispricing of the earnings component of interest.

Sloan (1996) conducts the hedge-portfolio analysis by forming portfolios on one variable, accrued earnings. In this study, I first partition sample firms annually into three groups: good news, no news and bad news, based on the return news, $FRET_t$. Then, *independently*, I partition the *whole* annual sample again into five portfolios, based on the amount of accrued earnings, $ACCR_t$. Then I track one-year-ahead abnormal returns to the return news-accruals portfolios. That is, I implement the accrual-based hedge strategy within each return-news group. If the persistence of accruals is different across news groups, and if the market fails to fully adjust to this, I expect an accrual-based hedge strategy to earn higher abnormal returns for the news group in which the persistence of accruals is lower, relative to accruals in other news groups.

The measure of abnormal returns is the intercept term in a regression based on the Fama-French three-factor model.¹⁶ Fama and French (1993) argued that this model accounts for the majority of the cross-sectional variation in portfolio returns over time. When I use this measure of abnormal returns, I only use firm-years with a December fiscal-year-end. Each year, firms are assigned to one of 15 return news-accrual portfolios. Then I compute the monthly equal-weighted returns for the highest-accrual portfolio, lowest-accrual portfolio, and hedge portfolio for the twelve months in the one-year-ahead period, starting with the fifth month after fiscal-year-end t . As a result, we have a time-series of monthly portfolio returns and three factors. Then I run the three-factor model, and the intercept term is the monthly abnormal return to the portfolio. Multiplying this by 12, I get an annual portfolio abnormal return (Hribar, 2000; Xie, 2001):

$$R_{i,t} = R_{m,t} + \alpha_i + \beta_1 R_{SMB,t} + \beta_2 R_{HML,t} + \epsilon_{i,t} \quad (7)$$

- $R_{i,t}$ the one-month Treasury bill rate (from Ibbotson Associates)
- $R_{m,t}$ the value-weighted return on all NYSE, AMEX, and NASDAQ stocks
- SMB, the difference between the month t returns of a value-weighted portfolio of small stocks and one of large stocks
- HML, the difference between the month t returns of a value-weighted portfolio of high book-to-market stock and one of low book-to-market stocks

3.3. Sample selection and descriptive statistics

I draw my sample firms from COMPUSTAT industrial, full-coverage and research files, and stock returns and size-portfolio returns from CRSP. Only firms that are traded on the New York Stock Exchange, the American Stock Exchange, and the NASDAQ are included. My sample starts in 1964 and ends in 1997. My final sample with necessary data consists of 56,940 firm-years for 5617 firms. Among these, 11,377 firm-years are classified into the good-news group, 34,188 firm-years into the neutral-news group, and 11,375 firm-years into the bad-news group.

Table 1 provides sample statistics of and correlation coefficients among some variables. The results in Table 1 are very consistent with those in prior studies. For example, Panel A

Table 1
Descriptive statistics and correlations of selected variables

Panel A: Descriptive statistics of selected variables

Variables	Mean	STD	5%	10%	25%	Med	75%	90%	95%
EARN	0.110	0.097	-0.053	0.002	0.061	0.111	0.165	0.225	0.267
CASH	0.126	0.109	-0.065	-0.005	0.067	0.131	0.192	0.255	0.298
ACCR	-0.015	0.080	-0.138	-0.105	-0.063	-0.022	0.026	0.085	0.129
FRET	0.175	0.443	-0.401	-0.302	-0.120	0.104	0.376	0.729	1.028
ABRET	0.028	0.492	-0.556	-0.444	-0.257	-0.045	0.026	0.054	0.083

Panel B: Pearson (above diagonal) and Spearman (below diagonal) correlations among selected variables

	LDEAN	CASH	ACCR	FRET	ABRET
LDEARN		0.58	0.13	0.24	0.21
CASH	0.56		-0.52	0.16	0.04
ACCR	0.14	-0.50		0.09	-0.07
FRET	0.29	0.19	0.08		-0.01
ABRET	0.27	0.09	-0.08	0.01	

Notes: variable definition.

ACCR ΔCA $\Delta CASH$ ΔCL ΔSTD ΔTP DEP

CA = current assets (COMPUSTAT data item 4)

CASH = cash (COMPUSTAT data item 1).

CL = current liability (COMPUSTAT data item 5).

STD = debt included in current liabilities (COMPUSTAT data item 34).

TP = income tax payable (COMPUSTAT data item 71).

DEP = depreciation and amortization expenses (COMPUSTAT data item 14).

$CASH_t = EARN_t - ACCR_t$

EARN = COMPUSTAT data item 178.

LDEAR is one-year-ahead earnings

$ABRET_t = \prod_{i=1}^{12} (1 + RET(i)) - \prod_{i=1}^{12} (1 + SIZRET(i))$

ABRET: 12-month compounded size-adjusted returns.

RET(i): firm raw return in month i , where $i=1$ is the fifth month after fiscal-year-end.

SIZRET(i): return on the size portfolio corresponding to the firm in month i , the size portfolio is supplied by CRSP

$FRET_t = \prod_{i=1}^{12} (1 + RET(i)) - 1$

FRET _{t} : compounded annual firm returns during fiscal-year t

shows that on average, accruals are income-decreasing, with a mean of -0.015 and a median of -0.022 . Panel B indicates that current cash earnings have a much stronger correlation with one-year-ahead earnings, with a Pearson (Spearman) correlation coefficient of 0.58 (0.56), than current accrued earnings, which have a Pearson (Spearman) correlation coefficient with one-year-ahead earnings of 0.13 (0.14).

Next, I test whether or not there is a differential between the persistence of accrued earnings for the bad- good-news group and that of accrued earnings for the neutral-news group. Then I test whether or not the market efficiently prices this differential in persistence, if it exists.

3.4. Differences in the persistence of accruals among return-news groups

I test the differential persistence of accruals between the bad-news group and the neutral-news group by running regressions with Eq. (5). Panel A of Table 2 reports the results. The persistence factor for the neutral-news group is 0.75 , but for the bad-news group, the persistence factor is smaller, by -0.12 , at 0.63 . The difference is statistically significant with a t -statistic of -12.99 . As expected, accrued earnings for the bad-news group are less persistent in predicting future earnings than accrued earnings for the neutral-news group. Cash earnings are also less persistent for the bad-news group than for the neutral-news group, with a differential of -0.06 . However, the differential for accrued earnings represents a 16.0% drop in persistence, but the differential for cash earnings represents only a 7.2% drop in persistence.

Panel B of Table 2 reports parallel results for testing the differential persistence between the good-news group and the neutral-news group. The differential persistence for both accruals and cash earnings, although statistically significant, is much smaller. For accrued earnings, the persistence factor of the good-news group is lower than that of the neutral-news group by -0.04 (a 5.3% drop in persistence). For cash earnings, the persistence factor of the good-news group is lower than that of the neutral-news group by -0.03 (a 3.6% drop in persistence).

Table 2

Ordinary least-squares regressions of future earnings on the accruals and cash components of current earnings

Panel A: The bad-news group versus the neutral-news group

	b_0	b_1	c_0	c_1	$b_0 + b_1$	$c_0 + c_1$	R^2
Estimate	0.83	-0.06	0.75	-0.12	0.77	0.63	0.62
t -statistic	212.46	-9.18	138.34	-12.99			

Panel B: The good-news group versus the neutral-news group

	b_0	b_1	c_0	c_1	$b_0 + b_1$	$c_0 + c_1$	R^2
Estimate	0.83	-0.03	0.75	-0.04	0.80	0.71	0.63
t -statistic	229.13	-4.35	149.20	-3.95			

Notes: Variable definitions: see Table 1 notes. ID is a dummy variable that takes value one for bad-news firms and zero for neutral-news firms.

$$\text{EARN}_{t+1} = a_0 + a_1 \text{ID}_t + b_0 \text{CASH}_t + b_1 \text{CASH}_t * \text{ID}_t + c_0 \text{ACCR}_t + c_1 \text{ACCR}_t * \text{ID}_t + e$$

In the premise of this study, it is difficult to make a clear prediction regarding the difference in the level of persistence for accruals between the good-news group and the neutral-news group, because accounting conservatism and earnings management in response to stock-price movement do not dictate that accrued earnings for the good-news group should be more or less persistent. The result here indicates that accrued earnings are also less persistent in predicting future earnings for the good-news group than for the neutral-news group. However, the differential is much smaller than the differential between the bad-news group and the neutral-news group.

3.5. *The Mishkin test*

Sloan (1996) shows that accrued earnings are less persistent than cash earnings, whereas the previous section shows that accrued earnings preceded by bad return news are incrementally less persistent. This section tests whether the market misprices this differential in persistence for accrued earnings.

The first test of market efficiency is the Mishkin test. The test results are reported in Table 3. Panel A reports the coefficient estimates of Eqs. (5) and (6).

For the neutral-news group, the actual persistence factor for accrued earnings is 0.75; however, the market overestimates this factor by 18.7%, to be 0.89. The likelihood ratio for the efficient-pricing constraint $c_0 - c_0^e$ is 62.43 (Panel B), and it is statistically significant, which rejects the efficient pricing of accrued earnings for the neutral-news group.

Between the bad-news group and the neutral-news group, the differential persistence factor is -0.12 , but the market-perceived difference is 0.06. The likelihood-ratio statistic for the efficient pricing of this differential persistence ($c_1 - c_1^e$) is 31.60, signaling that the market overestimates the differential persistence for accrued earnings between the bad-news group and the neutral-news group.

Overall, for the bad-news group, the market overestimates the persistence factor for accrued earnings by 50.8% (an actual persistence factor of 0.63 versus a market-perceived persistence factor of 0.95, with a significant likelihood ratio of 219.46 for the efficient-pricing constraint, $c_0 - c_0^e$, $c_1 - c_1^e$). The overestimation of the persistence factor of accrued earnings for the bad-news group (50.8%) is markedly higher than for the neutral-news group (18.7%).⁷

Thus, the Mishkin test supports the argument that the market does not fully see through the incrementally lower persistence of the accrued earnings for the bad-news group than for the neutral-news group, and that the market misprices the stocks in the bad-news group to a greater extent.

Table 3 also reports the results for cash earnings. Sloan (1996) reports that investors underestimate the persistence for cash earnings. However, Table 3 shows no underestimation of the persistence of cash earnings for the neutral-news group (with a likelihood ratio at an insignificant 2.28 for the efficient-pricing constraint $b_0 - b_0^e$). For the bad-news group, while the actual persistence factor is 0.77, the market overestimates it by 13%, at 0.87 (with a

⁷ I do not attempt to test statistically the significance level of the difference between the mispricing of accrued earnings for the neutral-news group and the mispricing of accrued earnings for the bad-news group, because such a test statistic is not readily available (Xie, 2001).

Table 3

Nonlinear generalized least squares estimation (the Mishkin test) of the market pricing of accruals with respect to their implications for one-year-ahead earnings, the bad-news group versus the neutral-news group

Panel A: the Mishkin test results

Parameter	Bad-news versus neutral-news		Good-news versus neutral-news	
	Estimate	Asymptotic standard error	Estimate	Asymptotic standard error
b_0	0.83	0.004	0.83	0.004
b_0^c	0.85	0.013	0.85	0.011
	2.4%*		2.4%*	
b_1	-0.06	0.007	-0.03	0.007
b_1^c	0.02	0.022	-0.07	0.020
	13.0%*		-2.5%*	
c_0	0.75	0.005	0.75	0.005
c_0^c	0.89	0.018	0.89	0.015
	18.7%*		18.7%*	
c_1	-0.12	0.009	-0.04	0.009
c_1^c	0.06	0.031	-0.02	0.028
	59.8%*		22.5%*	
β	2.28	0.035	2.47	0.035

Panel B: Test of efficient pricing of earnings components

Efficient pricing constraints	Bad-news versus neutral-news		Good-news versus neutral-news	
	Likelihood ratio statistics	Marginal significance level	Likelihood ratio statistics	Marginal significance level
$b_0 - b_0^c$	2.28	0.14	2.69	0.11
$b_1 - b_1^c$	13.33	<0.01	4.04	0.05
$c_0 - c_0^c$	62.43	<0.01	72.16	<0.01
$c_1 - c_1^c$	31.60	<0.01	0.44	0.52
$b_1 - b_1^c - c_1 - c_1^c$	33.12	<0.01	7.62	<0.01
$b_0 - b_0^c - b_1 - b_1^c$	33.50	<0.01	4.48	0.04
$c_0 - c_0^c - c_1 - c_1^c$	219.46	<0.01	112.03	<0.01
$b_0 - b_0^c - b_1 - b_1^c - c_0 - c_0^c - c_1 - c_1^c$	228.20	<0.01	150.09	<0.01

Note:

Variable definition: see Table 1 notes. ID_t is a dummy variable that takes value one for bad-news good-news firms and zero for neutral-news firms.

Numbers with * are percentages of misestimation and are computed as (market-perceived persistence/actual persistence)/actual persistence.

$$EARN_{t+1} = a_0 + a_1 ID_t + b_0 CASH_t + b_1 CASH_t * ID_t + c_0 ACCR_t + c_1 ACCR_t * ID_t + e$$

$$ABRFT_{t+1} = \gamma + \beta^* (EARN_{t+1} - a_0 - a_1 ID_t - b_0 CASH_t - b_1 CASH_t * ID_t - c_0 ACCR_t - c_1 ACCR_t * ID_t)$$

statistically significant likelihood ratio at 33.50 for the efficient pricing constraint $b_0 - b_0^c$ ($b_1 - b_1^c$). The overestimation for the bad-news group is mainly due to the overestimation of the differential-persistence of cash earnings between the bad-news group and the neutral-news group. While the actual differential persistence factor for cash earnings is -0.06, the market perceives it to be 0.02 (with a statistically significant likelihood ratio of 13.33 for the efficient-pricing constraint $b_1 - b_1^c$).

Table 3 also reports the Mishkin results for the good-news group and neutral-news group comparison. First, while the market overestimates the persistence factor of accrued earnings for the neutral-news group by 18.7%, it does so by 22.5% for the good-news group (an actual persistence factor of 0.71 versus a market-perceived persistence factor of 0.87, with a statistically significant likelihood ratio of 112.03 for the efficient pricing constraint $c_0 - c_0^e$, $c_1 - c_1^e$). The difference in misestimation, 22.5% versus 18.7%, is much smaller than that between the bad-news group and the neutral-news group, 50.8% versus 18.7%. Second, the differential-persistence factor for accrued earnings between the good-news group and the neutral-news group is -0.04, but the market perceives it to be -0.02. The likelihood-ratio statistic for the efficient pricing of the differential persistence ($c_1 - c_1^e$) is only 0.44, which lacks statistical significance. Therefore, the Mishkin test indicates that the market does not misestimate the persistence of accruals to a greater extent for the good-news group than for the neutral-news group.

The market does not appear to misestimate the persistence of cash flow for the neutral-news group (an insignificant likelihood-ratio statistic of 2.69 for the efficient-pricing constraint $b_0 - b_0^e$). With marginal statistical significance (a likelihood ratio of 4.04 for the efficient-pricing constraint $b_1 - b_1^e$), the market underestimates the differential persistence for cash flow between the good-news group and the neutral-news group. Overall, the market appears to underestimate the persistence of cash earnings in the good-news group by 2.5% (an actual persistence factor of 0.80 versus a market-perceived factor of 0.78, with a significant likelihood ratio of 7.62 for the efficient-pricing constraint $b_0 - b_0^e$, $b_1 - b_1^e$). This is the only case consistent with Sloan's (1996) finding that market underestimates the persistence of cash earnings.⁸

3.6. The hedge-portfolio analysis

I complement the Mishkin test with a hedge-portfolio test, which tests whether a trading strategy based on accruals would yield higher abnormal returns for the bad-news group than it would for the neutral-news group. For each year, I partition firms independently into five accrual portfolios and three return-news portfolios (bad-news, good-news, and neutral-news). Each of the 15 return news-accruals portfolios that this procedure generates consists of firms falling into an accrual return news intersection. As a result, I get five accrual sub-portfolios for each return-news group. To implement a hedge strategy for each return-news group, I long stocks in the lowest-accrual portfolio of that return-news group, and short stocks in the highest-accrual portfolio of that return-news group. The hedge return is the sum of the returns from the long and the short portfolios. I track the returns to the hedge portfolios in the one-year-ahead period to determine whether economically significant abnormal profits can be earned.

The measure of abnormal returns is the intercept term from a regression with the Fama-French three-factor model. The results are reported in Table 4. Panel A reports the coefficient estimates for the long, short, and hedge portfolios for each of the three return-news groups separately. My discussion focuses on the hedge portfolio, whose returns are the sum of

⁸ I conducted a Mishkin test for the mispricing of accruals and cash flows in the full sample, and find that cash flows were overpriced, contrary to evidence from earlier literature.

Table 4
Abnormal returns to accrual portfolios and hedge portfolios

Panel A: Portfolio returns by return-news groups

		Intercept	MKT	SMB	HML	R ²
Bad-news group	Lowest-accrual portfolio	0.488 (2.67)	1.019 (22.43)	1.353 (21.02)	0.530 (7.15)	0.774
	Highest-accrual portfolio	-0.244 (-1.49)	1.072 (26.32)	1.314 (22.75)	0.303 (4.55)	0.819
	Hedge portfolio	0.732 (3.86)	-0.054 (-1.14)	0.039 (0.59)	0.228 (2.95)	0.028
	Lowest-accrual portfolio	0.336 (4.23)	0.976 (49.35)	0.828 (29.52)	0.327 (10.12)	0.923
Neutral-news group	Highest-accrual portfolio	-0.011 (-0.14)	1.021 (52.83)	1.002 (36.57)	0.075 (2.36)	0.942
	Hedge portfolio	0.347 (3.29)	-0.045 (-1.71)	-0.174 (-4.68)	0.252 (5.89)	0.184
	Lowest-accrual portfolio	0.432 (2.75)	0.963 (24.66)	0.892 (16.12)	-0.139 (-2.17)	0.783
Good-news group	Highest-accrual portfolio	-0.146 (-1.29)	1.110 (39.22)	1.035 (25.77)	-0.214 (-4.64)	0.903
	Hedge portfolio	0.579 (3.27)	-0.147 (-3.25)	-0.142 (-2.28)	0.076 (1.05)	0.067

Panel B: Difference in portfolio returns between return-news groups

		Intercept	MKT	SMB	HML	R ²
Bad news/neutral news	Lowest-accrual portfolio	0.151 (0.86)	0.043 (0.97)	0.526 (8.43)	0.204 (2.83)	0.171
	Highest-accrual portfolio	-0.233 (-1.52)	0.052 (1.36)	0.312 (5.78)	0.228 (3.67)	0.105
	Hedge portfolio	0.385 (1.95)	-0.009 (-0.18)	0.213 (3.07)	-0.025 (-0.31)	0.018
	Lowest-accrual portfolio	0.096 (0.58)	-0.013 (-0.31)	0.065 (1.11)	-0.465 (-6.97)	0.121
Good news/neutral news	Highest-accrual portfolio	-0.136 (-1.03)	0.090 (2.75)	0.033 (0.71)	-0.289 (-5.41)	0.128
	Hedge portfolio	0.232 (1.21)	-0.103 (-2.15)	0.032 (0.47)	-0.176 (-2.26)	0.010

Notes

The Fama-French model is based on Fama and French (1993). It is in the following form:

$$R_{it} = R_{ft} + \alpha + \beta_1(R_{mt} - R_{ft}) + \beta_2 \text{SMB}_t + \beta_3 \text{HML}_t + \epsilon_{it}$$

R_{ft} = the one-month Treasury bill rate (from Ibbotson Associates).

R_{mt} = the value-weighted return on all NYSE, AMEX, and NASDAQ stocks (from CRSP).

SMB_t = the difference between the month t returns of a value-weighted portfolio of small stocks and one of large stocks.

HML_t = the difference between the month t returns of a value-weighted portfolio of high book-to-market stocks and one of low book-to-market stocks.

$R_{p,t}$ is the equally-weighted returns of all stocks in a portfolio.

returns to the long and the short portfolios. For the hedge portfolio, the intercept term for the bad-news group is 0.732 (8.8% on an annual basis), 0.579 for the good-news group (6.9% on an annual basis), and 0.347 for the neutral-news group (4.2% on an annual basis), which are all statistically significant.

Panel B reports the differential returns to the accrual-based hedge strategy across the three return-news groups. For example, when I compare the bad-news group to the neutral-news group on accrual-based hedge returns, I take the differences between the monthly hedge returns for the bad-news group and the monthly hedge returns for the neutral-news group, then I regress this time-series of monthly differential hedge-returns on the Fama-French factors. If the intercept term is statistically significantly greater than zero, it indicates that after controlling the Fama-French factors, the accrual-based hedge strategy earns higher abnormal returns for the bad-news group than for the neutral-news group.

The intercept term is 0.385 (4.6% on an annual basis) when I compare hedge returns between the bad-news group and the neutral-news group, and the intercept term is significant with a *t*-statistic of 1.95. This result confirms the Mishkin test finding (Table 3) that investors significantly overestimate the differential persistence of accrued earnings between the bad-news group and the neutral-news groups. Most importantly, such mispricing is economically significant and can be exploited to earn higher abnormal returns for an accrual-based hedge strategy.

In the good-news group/neutral-news group comparison, the intercept term is 0.232 (2.8% on an annualized basis), but it is not statistically significant, consistent with the Mishkin test finding (Table 3) that while investors overestimate the persistence of accrued earnings for the good-news group more than for the neutral-news group, the difference is not statistically significant.

In summary, the Mishkin test and the hedge-portfolio test suggest that the market fails to recognize the incrementally lower persistence of accrued earnings for the bad-news group and, subsequently, misprices those stocks to a greater extent. For the good-news group, there is evidence of lower persistence of accrued earnings than for the neutral-news group. But the differential is small relative to that between the bad-news group and the neutral-news group, and greater mispricing is not detected. The Sloan accrual anomaly concentrates on bad-news firms.

3.7. Multivariate analysis of returns to accrual-based trading strategy

There is one concern about the strength of the conclusions derived from the hedge-portfolio analysis. Low-accrual portfolios tend to contain low-return stocks, and high-accrual portfolios tend to contain high-return stocks. Therefore, the higher hedge returns from the bad-news group may be a result of a larger magnitude of income-decreasing accruals, which tend to accompany bad return-news stocks. Even without a differential in persistence, such a larger magnitude of accruals for the bad-news group would yield higher hedge returns. This argument contradicts my argument that it is the differential in persistence of accrued earnings that leads to the higher hedge returns.

To address this concern, I conduct a multivariate analysis in the following form:

$$\begin{aligned} \text{FRET}_{i,t-1} = & \alpha_0 + \alpha_1 \text{ID}_t + \beta_0 \text{ACCR}_t + \beta_1 \text{ACCR}_t * \text{ID}_t + \gamma_0 \text{SIZE}_t \\ & + \gamma_1 \text{SIZE}_t * \text{ID}_t + \delta_0 B/P_t + \delta_1 B/P_t * \text{ID}_t + \zeta_0 \text{BETA}_t \\ & + \zeta_1 \text{BETA}_t * \text{ID}_t + \eta_0 E/P_t + \eta_1 E/P_t * \text{ID}_t + e_t \end{aligned} \quad (8)$$

The dependent variable is a one-year-ahead raw return. This multivariate analysis has two important features. First, the regression includes a variety of control variables used in accounting and finance literature as proxies for factors that predict stock returns (Penman & Zhang, 2002; Sloan, 1996). Among them are firm size, book-to-market ratio, CAPM beta, and earnings-to-price ratio. Second, I include a dummy variable, *ID*, which interacts with *ACCR* and other variables in the regression, indicating which return-news group a firm falls into. For the bad-news group and the neutral-news group comparison (other comparisons defined similarly), β_0 measures the relation between accrued earnings and firms' one-year-ahead stock returns for the neutral-news group; and β_1 measures the incremental relation (relative to the neutral-news group) between accrued earnings and future stock return. If, after controlling for the magnitude of accruals and these variables that have been proved to predict future returns, β_1 is still significantly negative, it supports my argument that the differential persistence of accrued earnings for the bad-news group drives the greater mispricing of accruals.

Following Fama and MacBeth (1973), I run Eq. (8) annually. Table 5 reports the means of the time-series of coefficient estimates. The *t*-statistics are based on the time-series of the standard errors of the estimated coefficients. When comparing the bad-news group to the neutral-news group, β_0 , the coefficient on accruals for the neutral-news group, is significantly negative at -0.322 . β_1 , the incremental relation between accrued earnings and future returns

Table 5

Cross-sectional tests of the differential explanatory power of accruals with respect to future raw returns

	Definition	Bad-news group neutral-news group		Good-news groups. neutral-news group	
		Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic
α_0	Intercept	0.259	4.78***	0.259	4.78***
α_1	Incre. Intercept	0.040	1.11	0.029	0.66
β_0	ACCR	-0.322	-4.86***	-0.322	-4.86***
β_1	Incre. ACCR	-0.178	-2.17**	0.031	0.32
γ_0	SIZE	-0.025	-3.57***	-0.025	-3.57***
γ_1	Incre. SIZE	-0.013	-2.53**	0.002	0.24
δ_0	Book-to-Market	0.003	0.26	0.003	0.26
δ_1	Incre. Book-to-Market	-0.006	0.43	-0.000	-0.01
ζ_0	CAPM Beta	-0.003	-0.23	-0.003	-0.23
ζ_1	Incre. CAMP Beta	0.006	-0.49	-0.039	-2.43
η_0	Earnings-to-price	0.183	2.07**	0.183	2.07***
η_1	Incre. Earnings-to-price	0.000	0.01	0.090	0.97

Notes:

The numbers reported are time-series averages of the estimated parameters from annual cross-sectional regressions. *T*-statistic is based on the time-series standard errors of the estimated coefficients.

The dependent variable is one-year-ahead raw returns. *ACCR* is defined in Table 1. *Size* is market value at the end of fiscal-year *t*. *B/P* is book value-to-market value at the end of fiscal-year *t*. *E/P* is earnings-to-price ratio at the end of fiscal-year *t*. *BETA* is estimated from a regression of monthly raw returns on the CRSP value-weighted monthly stock returns up to the last month of fiscal-year *t*.

** Denotes significance at the 0.05 level using a two-tailed *t*-test.

*** Denotes significance at the 0.01 level using a two-tailed *t*-test.

$$\text{FRET}_t = \alpha_0 + \alpha_1 \text{ID}_t + \beta_0 \text{ACCR}_t + \beta_1 \text{ACCR}_t * \text{ID}_t + \gamma_0 \text{SIZE}_t + \gamma_1 \text{SIZE}_t * \text{ID}_t + \delta_0 \text{B/P}_t + \delta_1 \text{B/P}_t * \text{ID}_t + \zeta_0 \text{BETA}_t + \zeta_1 \text{BETA}_t * \text{ID}_t + \eta_0 \text{E/P}_t + \eta_1 \text{E/P}_t * \text{ID}_t + \varepsilon_t$$

for the bad-news group, is significantly negative at -0.178 . This supports my findings that the incrementally lower persistence of accrued earnings for the bad-news group causes greater mispricing, consistent with the findings of the Mishkin and hedge-portfolio tests. On the other hand, β_1 in the good-news neutral-news comparison is insignificant, also consistent with the Mishkin test and the hedge-portfolio test.

In summary, multivariate analysis supports the conclusions from the Mishkin and hedge-portfolio tests.

4. Conclusion

This paper adds to a growing literature on financial-statement analysis with regard to earnings accruals and their implications for the efficient-market hypothesis. I argue that in response to stock performance, accounting conservatism and earnings management generate earnings accruals that are less persistent for firms that have experienced adverse stock-price movements. The market fails to detect this differential persistence, and subsequently misprices accruals in this situation to a greater extent.

The results in this paper largely support this argument. Accrued earnings in years when firms performed poorly tend to be even less persistent than accrued earnings in years when firms' stock prices do not change much. However, investors do not fully understand this differential and subsequently misprice accrued earnings in this group to a greater extent.

Overall, this paper indicates that to understand the accrual anomaly, we need to take into account the environment in which accruals are generated. In particular, contemporaneous stock-price movement provides an indicator of the level of persistence of accrued earnings.

Nevertheless, this paper only provides one factor that predicts the lower persistence of accruals in the cross-section. The accrual effect is strong even for the neutral-news group, although a lot weaker than documented previously by other studies. Therefore, future work is warranted to enhance our understanding of why the market fails to appreciate this long-held, basic accounting property: accrual accounting.⁹

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⁹ Dopuch et al. (2005) is another example along this line of research. They find that accruals were mispriced only for profit firms, not for loss firms. In my sample, however, accruals were also overpriced for loss firms.

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An analysis of the adoption, perceived benefits, and expected future emphasis of western management accounting practices in Chinese SOEs and JVs

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Abstract

This paper considers the adoption, perceived benefits, and expected future emphasis of western management accounting practices in the Chinese emerging market economy based on a sample of 64 joint ventures (JVs) and 115 State Owned Enterprises (SOE) gathered from a questionnaire survey. The study finds that the level of adoption of management accounting practices is most influenced by ownership type of the enterprise (JV or SOE) and to a lesser extent by the nature of the management accounting techniques to be adopted. A further significant finding is that management accounting practices such as budgeting for controlling costs, profit and sales budgeting, and target costing are perceived to be more beneficial for SOEs compared to JVs. However, responsibility accounting which is traditionally associated with SOEs and accounting for decision making is perceived to be less beneficial to SOEs compared with JVs.

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1. Introduction

After many decades of heavy government involvement in the economy, China has embraced a market-liberalization program which includes the attraction of foreign direct investments as a means of achieving rapid and sustainable economic growth. State

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intervention in enterprise management – particularly through State-Owned Enterprises (SOEs), a significant feature of the Chinese centrally planned economy – is being systematically dismantled. Prior research evidence indicates that over the last decade the modernization and restructuring of SOEs have been placed at the top of the economic-reforms agenda (Lee, 2001). At the core of these reforms is the massive shift in opinion about the role of the state in enterprise management in China. Policy makers in China now believe that dynamic economic growth requires a greater role for the private sector. As a result, privatization of SOEs has been a key element of Chinese market reforms. It is thus argued that privatization of SOEs will not only lead to efficient and effective allocation of resources but will also enable managers to take more responsibility for the well-being of the enterprises they run (Boateng & Glaister, 1999; Hassard, Sheehan, & Morris, 1999).

As privatization in China welcomes foreign investors, competition has heightened as monopoly positions granted to SOEs under the central-planning system have evaporated. This line of reasoning is consistent with the conclusion drawn by Child (1994). These changes in the business environment present challenges in terms of the coexistence of market forces and state influences (Child, 1994) and the organization of production and marketing (Lin, Cai, & Li, 1998). More importantly, these changes affect the information needs and processing techniques required to facilitate good decision making within firms. According to Firth (1996), the change towards a free-market enterprise system in China constitutes a major economic shock for many Sino companies, thereby leading to a serious performance gap, in that accounting systems developed under socialist philosophy are totally inadequate for the emerging capitalist structure.

Institutional theory suggests that organizations will respond to environmental complexity brought about by the changing task and institutional environments by adapting their management practices needed to ensure their long-term survival (DiMaggio & Powell, 1983, 1991; O'Connor, Chow, & Wu, 2004). In the context of China, Naughton (1995), Nee (1992), and Perkins (1994) argue that when a centrally planned system is dismantled, both the task and institutional environments become more uncertain and unpredictable which has implications for information needs for management decision making. The question is how do the Chinese SOEs adapt to meet the changing task and institutional environments as posited by institutional theory? A number of scholars such as Child and Markoczy (1993), Firth (1996), and Yan and Gray (1994) argue that reforms offer SOEs engaged in foreign joint ventures (JVs) an opportunity to model their foreign partner's capitalist-style management systems and management accounting practices. Others studies such as Kimberly (1980), Meyer and Rowan (1977), DiMaggio and Powell (1983) suggest that the opportunity to diffuse management ideas in a changing environment is not limited to foreign-partnered JVs, but extends across companies nationwide. Guthrie (1999) supports this line of reasoning and points out that the change in environment provides both impetus and opportunity for mimetic isomorphism, where SOEs perceive legitimate foreign enterprises as models to imitate.

Unlike Western economies, we know little about management accounting practices in the Chinese emerging capitalist economy. The few studies investigating management accounting practices in China, for example, Lin, Cai, and Li (1998), Firth (1996), and O'Connor, Chow, & Wu (2004) have focused on the factors influencing the adoption of

management accounting practices in either SOEs or JVs, but no attention has been paid to the benefits of adopting management accounting practices.

Modernization and internationalization of the Chinese economy since the 1980s have raised a number of questions, however some critics suggest that internationalization and economic reforms have destroyed China's long-term policy of self-reliance. Others contend that Western management accounting practices are unsuited to Chinese circumstances and, when adopted, have failed to meet expectations (Yang, 1999). In order to increase the adoption rate of traditional and contemporary management accounting practices in Chinese companies, we investigate the perceived benefits of such adoption. This paper examines data we collected from a survey to provide new empirical insights into management accounting practices in both SOEs and JVs in China with the aims of examining the adoption of management accounting practices in both Chinese SOEs and JVs; (2) considering the comparative perceived benefits derived by Chinese SOEs and JVs in adopting capitalist-style management accounting practices over a five-year period; and to consider the emphasis that SOEs and JVs intend to place on particular management accounting practices in the future.

The remainder of this paper is structured as follows: the next section reviews literature on the existing management accounting practices under the socialist system. The research method used is presented in Section 3. The Section 4 presents the results and discussion. The final section contains the summary and conclusions.

2. Literature review

2.1. *Management accounting practices prior to economic reforms*

A number of western scholars have suggested that under China's centrally planned economy, SOEs only carried out fund accounting rather than business accounting (Chan & Rotenberg, 1999; Chow, Chau, & Gray, 1995; Xiang, 1998). This notion was based on the fact that enterprises under the socialist philosophy were tightly controlled by the government in respect to product planning, material supplies, cost targets, and product distribution. However, this is at variance with the views of Chinese accounting academicians such as Yang (1999) who point out that prior to economic reforms in 1980, management accounting practices and cost accounting were important methods for measuring SOEs performances under the centrally planned economy. During the first 15 years of the founding of the People's Republic of China (1950–1965), two notable developments that occurred in management accounting practices were the build-up of cost accounting systems for different industries and the implementation of cost management techniques. An analysis by Yang (1999) indicated that management accounting techniques, such as responsibility accounting, were widely employed in SOEs and documented in the accounting literature. This line of thinking is supported by Xiang (1998) who indicated management accounting played an important role in assisting the economic planning and implementation of state economic policies.

In short, the management accounting practices relating to planning and budgeting that were appropriate for a centrally planned economy were broadly applied in SOEs between the 1950s and 1970s. For example, "The Enterprise Financial Plan" which was all-inclusive and very

detailed was similar to a master budget. “Cost units” were equivalent to cost centers, “internal profit units” (i.e. artificial profit centers) contained some elements of profit centers in terms of the Western concept. However, Western practices of management accounting relating to decision making could not be adopted easily because the socialist system provided no opportunity for decentralized investment decisions. For example, an academic paper which described cost–volume–profit (CVP) analysis was published in the early 1950s in the *New Accounting* (a Chinese magazine), but it was not until 30 years later that CVP and other Western practices of management accounting were formally introduced into China (Yang, 1999).

The process of diffusion and adoption of Western management accounting in China began with the economic-reform policies that started in 1978. There are four stages to this process. The first stage, the introduction of Western theories and practices of management accounting in textbooks, magazines, and academic papers, occurred between the late 1970s and the early 1980s (Yang, 1999). The second stage, the learning and enthusiastically attempting to implement Western techniques of management accounting, which lasted for approximately 10 years. Scapens and Yan (1993) summarized these practices as follows: CVP analysis, operational budgeting, responsibility accounting, standard costing/variance analysis, contribution analysis, variable costing, transfer pricing, and investment appraisal techniques. Among these methods, CVP analysis, contribution analysis, and operational budgeting were of special interest to Chinese enterprises because of the ability to link target profit with planning operations. The diffusion of management accounting practices at that time was much quicker and was at the forefront of accounting reforms compared with financial accounting reforms and the adoption of international accounting standards.

The third stage marks a cooling off of the reception and subsequent neglect of Western techniques of management accounting. From the middle of the 1980s to the middle of the 1990s, Chinese academics and practitioners began to question the suitability of importing Western practices of management accounting without considering that the diffusion of management accounting techniques may be highly conditional on the Chinese national culture. According to Yang (1999), the benefits of applying Western methods of management accounting did not meet the initial high expectations.

The fourth stage started at the end of the 1990s when the Chinese accounting profession realized that the transition from a centrally planned economy to a full market economy would be a long and complicated process. Chinese environmental factors such as market maturity, the progress of enterprise reforms, the legal, bureaucratic, and administrative systems, the quality of management team and accounting personnel in SOEs, and the inertia of traditional systems have limited the diffusion and use of management accounting practices. Chinese academics and practitioners are now reconsidering and seeking to identify those practices that are suitable within the Chinese context in order to establish an appropriate Chinese version of management accounting. Considerable attention has been given by Chinese academics and practitioners in many large-sized SOEs to the use of management accounting practices in recent years (Yang, 1999).

2.2 *Joint ventures and state owned enterprises*

The dominant entry strategy for foreign companies into the Chinese market is through JVs with SOEs. Beamish (1993) suggests that the frequency of association with

government partners is far greater in the People's Republic of China (PRC) than in other developing countries. Yu and Tang (1992) support this conclusion and point out that the risks of operating in China without JVs are high. JVs are also the Chinese government's preferred mechanism for introducing foreign direct investment into China as it enables the government to continue exercising control (Pearson, 1991). Moreover, it is argued that JVs enable SOE partners to benefit from the technological know-how, management skills, and capital brought in by the foreign partners while providing foreign partners with the knowledge of the domestic market, reduced risks, and political advantages (Hu & Chen, 1996; Miller, Glen, Jasperen, & Karmokolias, 1997).

Based on an awareness that JV partners may have incompatible management styles, approaches and different economic, social, and political systems, and values, the Chinese government has carried out overall reforms to help SOEs introduce advanced Western technology and management styles. These reforms have encouraged Chinese partners in JVs to accept the business frame of mind of their capitalist counterparts and compared with a traditional SOE, JVs are more dynamic in terms of structure and style. The typical JV uses advanced production and management techniques and recruits more new, young, and educated staff, and operates its business in accordance with market and competitive rules.

3. Methodology and sample characteristics

To gather data for our research we mailed a survey questionnaire to a sample of JVs and SOEs in China. The questions were based on the aims of the study and were modelled on the questionnaire of a similar study undertaken by Chenhall and Langfield-Smith (1998) in Australia. The questionnaire presented a list of 40 items aimed at identifying the following: (1) the perceived benefits received from management accounting practices adopted over the past 5 years and (2) the emphasis that SOEs and JVs intend to place on various management accounting practices in the future. Responses were assessed using a seven-point scale (i.e., 1=no benefit; 7=very high benefit; and 1=no emphasis; 7=very high emphasis). The middle-point (4) was labeled by an adjective representing a neutral or moderate opinion to help categorize the responses into groups such as low, moderate, and high. The questionnaire was divided into sub-groups as follows: (1) product cost systems, (2) budgeting and performance evaluation systems, (3) planning and control, (4) decision support systems, and (5) responsibility accounting. This structure was designed based on the following: (1) product costing systems are traditional practices used in Chinese organizations, especially in SOEs; (2) budgeting techniques in China are the most important financial performance measures in business management; (3) performance measures play a crucial role in translating business strategy into results (Lingle & Schiemann, 1996); (4) planning (especially long-term planning), forecasting and decision making are the most important key factors for organizations operating in today's rapid and changing competitive environment; (5) responsibility accounting is considered to be the most successful management accounting practice in the Chinese accounting literature (Qiao, 1997). Management accounting is a comparatively young discipline in China and most recently developed techniques have not been widely used. It is also likely that recently developed

and strategically focused practices of management accounting, such as benchmarking, balanced scorecard, and shareholder value analysis, may not be understood by the majority of Chinese accountants. Therefore, these items were not incorporated in the study.

During the questionnaire design stage a series of techniques were employed in order to maximize the response rate. First, a pre-test of the questionnaire was undertaken in two stages. The first stage involved Professor Yu Xuying at Xiamen University (one of the pioneers who introduced Western practices of management accounting into China) together with six other academics at Chinese universities. The second involved six senior managers in 4 SOEs and 2 JVs in China.

The research population of interest was obtained from secondary sources (The State Economic and Trade Commission, 1999 – SETC, PRC and Ministry of Foreign Trade and Economic Cooperation – MOFTEC, PRC, 1998). These sources of data were used because they are the authorized company database and represent the most reliable sources in China. The data used in this study consist of senior financial managers' perceived benefits of adopting management accounting practices. In 2000 and 2001, 1093 questionnaires were mailed or delivered to the senior financial managers of JVs and SOEs in China. We received 179 usable responses, representing an overall response rate of 19%–64 (36%) from JVs and SOEs from 115 (64%).¹

3.1. Sample characteristics

The characteristics of the sample are summarized in Table 1. Manufacturing constitutes about three-quarters of both JV and SOE samples, and the fourth quarter consist of enterprises in agriculture (forestry and fishery), financial services (banking and insurance), transport (road, sea, rail, and air transport), general trade (retail, wholesale, and import and export trade), building and construction, information technology, other services (hotel, restaurant, travel, entertainment, and media). The size of the companies used in the sample was measured by the number of employees. Table 1 shows that companies employing more than 2000 people constitute about 44.4% of the sample. This is followed by companies employing between 500 and 2000 people (30.6%), and companies employing fewer than 500 (25%). In terms of age of the enterprises in the sample, Table 1 indicates that about 51.9% have been in existence for over 23 years, 19.1% between 10 and 22 years, and 29%, the majority of the sample, for fewer than 10 years.

3.2. Statistical analysis

The data analysis in respect to the adoption, benefit, and future emphasis were conducted by considering differences in the means of management accounting practices.

¹ A non-response bias was tested for by implementing chi-square and Mann–Whitney U' comparing early and late responses along a number of key descriptive variables. Differences between the two groups were not significant, suggesting that non-response bias is not a problem in this study.

Table 1
Sample characteristics

	JVs (%)	SOEs (%)	Total (%)
<i>Industry classification</i>			
Manufacturing	73.0	73.4	73.3
Agriculture	5.4	0	1.2
Financial services	2.7	4.0	3.7
Transport	2.7	4.8	4.3
General trade	0	8.1	6.2
Building and construction	10.8	2.4	4.3
Information technology	5.4	3.2	3.7
Other services	0	4.2	3.1
	100	100	100
<i>No. of employees</i>			
Less than 500	40.5	20.3	25.0
500–2000	35.1	29.3	30.6
More than 2000	24.4	50.4	44.4
	100	100	100
<i>Year established</i>			
Less than 10 years	62.2	19.2	29.0
10–22 years	32.4	15.2	19.1
More than 23 years	5.4	65.6	51.9
	100	100	100

Note: Number = 179.

Both parametric and non-parametric tests were used, that is, two-sample t-test and Mann–Whitney U.

4. Results and discussion

4.1. Adoption of management accounting practices in JVs and SOEs

Table 2 shows the comparative adoption levels of seven main groups of management accounting practices for JVs and SOEs. Three of the management accounting practices, namely, decision support systems ($p < 0.05$), planning and control ($p < 0.05$) and responsibility accounting ($p < 0.01$) have mean scores statistically different between JVs and SOEs. In respect to the three management accounting practices, JVs tend to have higher adoption rates compared with SOEs. However, in the case of management accounting practices relating to product cost systems, budgeting systems, detailed budget system, and performance evaluation system and rewards, JVs appear to have higher mean scores compared with SOEs but the differences were not statistically significant.

The results from this analysis suggest that foreign-partnered JVs tend to adopt management accounting practices to a much greater extent compared with SOEs [without foreign partners]. The evidence lends support to the conclusion drawn by Firth (1996) that JVs represent an important vehicle for the transfer of free market management ideas and techniques to business entities in centrally planned socialist economies. SOEs are less likely

Table 2

Relative importance of adoption of management accounting practices in China: JVs and SOEs

Management accounting practices	Ownership	Mean	SD	T-value
Product cost systems	JVs	4.36	0.73	-0.077
	SOEs	4.52	1.14	
Budgeting systems	JVs	5.03	0.84	1.050
	SOEs	4.83	1.07	
Detailed budgeting systems	JVs	4.88	0.79	-0.094
	SOEs	4.89	1.08	
Performance evaluation and rewards	JVs	4.48	0.84	0.767
	SOEs	4.32	1.15	
Decision support systems	JVs	4.57	1.05	1.915**
	SOEs	4.15	1.15	
Planning and control	JVs	4.53	0.88	2.346**
	SOEs	4.08	1.14	
Responsibility accounting	JVs	4.70	1.05	2.653***
	SOEs	4.05	1.32	

Notes: $N=179$; SD = standard deviation.** $p<0.05$; *** $p<0.01$

to adopt management accounting practices that provide data for managerial decision making compared to other techniques such as budgeting systems and group-performance evaluation. This is not surprising given the frequency of state interference and the level of the governance system in China. Despite the progress made in economic reforms, SOEs in China are still typical socialist organizations following a hierarchical model that exhibits complex features such as dual lines of authority and multiple centers of power. In SOEs, there is close cooperation between the government, the enterprise, and the communist party committee that parallels the managerial line within every enterprise. Moreover, the Chinese government influences SOEs' decision making through the appointment of managers, cadres, and party functionaries to boards of directors (Hassard, Sheehan, & Morris, 1999). While such influences are not uniform across industries and regions (Lin, Cai, & Li, 1998), the power of these appointed officials can reduce SOE management's ability to act, to restrict managerial discretion, and to adopt advanced management systems, thereby leading to reductions in organizational efficiency (Branine, 1996; Child, 1994; Groves, Hong, McMillan, & Naughton, 1994; Peng & Heath, 1996). This is consistent with O'Connor et al. (2004) finding that government influences can shift SOE management's attention away from efficiency or profitability. For instance, the government requires SOEs to retain redundant labor in order to maintain social stability. Goodall and Warner (1999) found that government influence impedes the adoption and implementation of new management practices. This may explain why SOEs attach relatively less importance to the adoption of management accounting techniques relating to performance evaluation and rewards, decision support systems, planning and control, and responsibility accounting — SOE managers do not appear to have strategic decision-making responsibilities.

In contrast, JVs are formally supervised by one board, which legally represents the interests of the owners. The board has decision making authority over strategic policy and planning and provides for a single hierarchy of executive authority accountable to the owners of capital. JVs in China, therefore, have much more autonomy to make decisions in

all aspects of the enterprises they run. These differences in governance and interferences by the state have an impact on the organizational performance and competitive abilities of both JVs and SOEs.

Other important factors that may account for the differences in the adoption of management accounting techniques are the norms and practices of SOEs under the socialist ideology emphasizing collective identity and regarding innovation as a matter for social rather than individual decisions. This implies that everyone in an SOE should share equally in the rewards according to the efforts of the team. General social solidarity and economic security are emphasized over the partial and individual interest. Thus under SOEs, workers are rewarded on the basis of team and group, rather than on individual achievements. This may explain why group-based management accounting practices are used more and valued by SOEs.

The diffusion of advanced management accounting techniques in SOEs may be restricted by two factors: a lack of knowledge on the part of the average accountant, and a weak sense of market competition held by the SOE management team. It may be argued that a commitment to hire high-quality accounting personnel and to adopting advanced production techniques suggests that new management accounting practices will be easier to implement. However, this is not the case in Chinese SOEs. SOEs continue to have old-fashioned production systems and managers are expected to implement production plans handed down to them by superior authority. This suggests that managers still lack decision-making responsibilities. This lack of authority coupled with the low wages paid to accounting personnel in SOEs (compared to those in JVs) makes it difficult to attract high quality staff which renders the implementation of new management ideas in SOEs extremely difficult.

The differences in management accounting practices in SOEs and JVs may be due to management norms and organizational cultural differences. Cultural differences affect people in terms of their thinking and behavior, and therefore influence managerial philosophy and practice (Hofstede, 1984; Gray, 1988; Perara, 1989; Chow, Chau, & Gray, 1995). Chinese traditional management norms can also impede the adoption of more formal, transparent processes and controls of management. Examples include security of employment, formal centralized bureaucracy, respect for status and seniority, and a strong sense of egalitarianism (Davidson, 1987; Von Glinnow & Teagarden, 1988; Baird, Marjorie, & Robert, 1990). These norms generally reflect a preference for well-established routines and procedures (O'Connor, Chow, & Wu 2004). The leaders of SOEs try to avoid some of these shortcomings and only choose certain features that do not conflict with valued local patterns. Therefore an innovation is likely to be stifled in older SOEs compared to a JV as it is a newer organization that recruits more new, young and educated staff. JV is also organized in terms of a new structure and system and uses advanced technique and management. The dynamic nature of such an enterprise is beneficial to innovation.

4.2. Benefits of management accounting practices: SOEs and JVs

Table 3 lists the average perceived benefits of management accounting practices ordered by the mean scores of respondents based on using each practice over the past 5 years for each of the JVs and SOEs in the sample. Table 3 indicates that several techniques (production budgeting, responsibility-centered accounting, customer satisfaction surveys, product life-cycle analysis, working capital budgeting, long-range forecasting,

Table 3

Management accounting practices: perceived benefits in JVs and SOEs

Management accounting practices	JV's average perceived benefit (past 5 years)			SOE's average perceived benefit (past 5 years)		
	Mean	SD	Rank	Mean	SD	Rank
Production budgeting	5.43	(0.90)	1	4.83	(1.28)	6
Budgeting for coordinating activities across the business units	5.23	(1.15)	2	4.80	(1.44)	8
Responsibility center accounting	5.17	(1.23)	3	4.03	(1.44)	28
Budgeting for profitability analysis	5.16	(1.26)	4	4.91	(1.52)	5
Performance evaluation and reward: customer-satisfaction surveys	5.14	(1.03)	5	4.43	(1.51)	15
Sales budgeting	5.13	(0.98)	6	4.94	(1.26)	3
Product life-cycle analysis	5.13	(1.41)	7	3.59	(1.80)	39
Budgeting for controlling costs	5.12	(1.08)	8	5.22	(1.32)	1
Cash/working capital budgeting	5.03	(1.18)	9	4.61	(1.46)	12
Long-range forecasting	4.93	(1.28)	10	3.96	(1.49)	32
Budgeting for planning financial position	4.91	(1.04)	11	4.76	(1.44)	9
Profits budgeting	4.91	(1.15)	12	4.95	(1.24)	2
Target costing	4.88	(1.15)	13	4.91	(1.46)	4
Activity-based management (ABM)	4.82	(1.33)	14	4.38	(1.56)	18
Cost–volume–profit/break-even analysis	4.77	(1.19)	15	4.59	(1.61)	13
Budgeting for day-to-day operations	4.75	(1.05)	16	4.80	(1.30)	7
Performance evaluation and reward: return on investment (ROI)	4.69	(1.00)	17	4.40	(1.60)	17
Responsibility budgeting	4.69	(1.32)	18	4.08	(1.52)	27
Performance evaluation and reward: employee attitudes	4.68	(1.22)	19	4.32	(1.35)	22
Investment appraisal non-discounting techniques (e.g., Payback, ROI)	4.68	(1.28)	20	4.02	(1.34)	30
Standard costing and variance analysis	4.68	(1.32)	21	4.21	(1.46)	24
Investment appraisal discounting techniques (e.g., NPV, IRR)	4.68	(1.38)	22	3.80	(1.71)	36
Performance evaluation and reward: group decision from top management	4.67	(1.27)	23	4.68	(1.41)	11
Performance evaluation and reward: controllable profit	4.65	(1.27)	24	4.33	(1.61)	21
Responsibility reporting distinguishing between controllable and non-controllable items	4.60	(1.26)	25	4.03	(1.53)	29
Product/service profitability analysis	4.53	(1.42)	26	4.36	(1.59)	19
Performance evaluation and reward: budget variance analysis	4.48	(1.35)	27	4.35	(1.49)	20
Strategic planning	4.48	(1.50)	28	4.20	(1.78)	25
Relevant and irrelevant cost analysis	4.46	(1.35)	29	3.84	(1.50)	33
Performance evaluation and reward: team performance	4.41	(1.37)	30	4.24	(1.42)	23
Performance evaluation and reward: divisional profit	4.41	(1.70)	31	4.57	(1.63)	14
Full (absorption) costing	4.33	(0.98)	32	4.68	(1.34)	10
Sensitivity analysis	4.25	(1.48)	33	3.83	(1.72)	34
Variable costing	4.18	(1.63)	34	4.40	(1.52)	16
Performance evaluation and reward: residual income	4.13	(1.25)	35	3.83	(1.78)	35
Performance evaluation and reward: cash flow return on investment	4.08	(1.19)	36	4.12	(1.78)	26
Activity-based costing (ABC)	4.00	(1.22)	37	4.00	(1.81)	31
Planning and control: personal business experience and intuitive managerial judgment	3.50	(0.97)	38	3.62	(1.27)	38
Performance evaluation and reward: individual judgment from immediate superior	3.16	(1.64)	39	3.65	(1.31)	37

responsibility budgeting, investment appraisal, relevant and irrelevant cost analysis) receive significantly different mean scores in JVs and SOEs. Employees in JVs perceive higher benefits from using the management accounting practices listed above than those in SOEs.

The results in Table 3 may help explain the findings reported in previous research. First, the long-standing nature of some management accounting practices used in SOEs, (e.g., operational budgeting and performance evaluation) and techniques promoted by the government and superior authorities (e.g., variable costing and Chinese “target costing”) were found to have higher perceived benefits for the SOEs than for JVs. Second, most of the recently developed strategically focused and market oriented practices (such as customer satisfaction surveys, long-range forecasting, activity-based management, strategic planning, and sensitivity analysis, investment-appraisal methods, and non-financial measures) tend to be perceived as more beneficial for JVs than SOEs. Third, management accounting practices that are based on Chinese traditional culture and management norms (e.g., group decisions from top management and individual judgement from immediate superiors, personal business experience and intuitive managerial judgement), have higher perceived benefits for the SOEs than for JVs.

The findings also indicate that the responsibility-accounting related practices have higher perceived benefits for JVs than for SOEs. This result is surprising in that responsibility accounting has been traditionally associated with Chinese SOEs and therefore it was expected that this long-standing management accounting practice should be perceived as more beneficial by employees in SOEs. However, this does not appear to be the case. Perhaps a reasonable explanation might be that the responsibility accounting practices promoted by the government in SOEs have not reached the level required for such practices to be most effective. In contrast, employees in JVs perceive these practices to be very beneficial as they suit the Chinese environments faced by JVs.

4.3. Future emphasis of management accounting practices

Table 4 shows the perceived expected future emphasis on each management accounting practice in the JV and SOE samples over the next 3 years following the survey. Table 4 indicates that the items that have significantly higher expected future emphasis by employees in JVs include strategically focused, market-oriented, product-development and profitability-related practices. Specific practices include strategic planning, product life-cycle analysis, long-range forecasting, standard costing variance analysis, product service-profitability analysis, sensitivity analysis, relevant and irrelevant cost analysis; non-financial measures of performance evaluation and rewards (i.e., customer-satisfaction surveys and employee attitudes), investment-appraisal techniques and responsibility-accounting related practices.

On the other hand, items that have relatively higher expected future emphasis in SOEs include long-standing detailed-budget related methods (i.e., profit budgeting, budgeting for financial planning purposes and operational budgeting), group-based methods of performance evaluation and rewards (such as divisional profit, team performance, and group decision from top management), subjective methods (i.e., business experience and intuitive managerial judgment and individual judgment from immediate superiors) and full-absorption costing. This finding suggests that despite many years of reforms, SOE employees expect much of the management accounting data produced in China to be

Table 4

Management accounting practices: expected future emphasis in JVs and SOEs

Management accounting practices	JV's expected future emphasis (next 3 years)			SOE's expected future emphasis (next 3 years)		
	Mean	SD	Rank	Mean	SD	Rank
Production budgeting	5.74	(0.96)	1	5.39	(1.29)	5
Strategic planning	5.71	(1.06)	2	5.32	(1.41)	7
Budgeting for controlling costs	5.61	(1.12)	3	5.56	(1.30)	3
Product life-cycle analysis	5.60	(1.45)	4	4.46	(1.81)	37
Budgeting for profitability analysis	5.56	(1.20)	5	5.26	(5.51)	10
Responsibility centre accounting	5.52	(1.16)	6	4.84	(1.33)	25
Cash/working capital budgeting	5.50	(1.14)	7	5.25	(1.39)	11
Long range forecasting	5.50	(1.41)	8	4.96	(1.28)	21
Sales budgeting	5.33	(1.11)	9	5.64	(1.25)	1
Target costing	5.33	(1.31)	10	5.42	(1.33)	4
Performance evaluation and reward: customer satisfaction surveys	5.29	(1.30)	11	5.19	(1.44)	13
Standard costing and variance analysis	5.27	(1.35)	12	4.79	(1.49)	29
Budgeting for coordinating activities across the business units	5.23	(1.27)	13	5.18	(1.42)	14
Profits budgeting	5.19	(1.28)	14	5.64	(1.25)	2
Product service profitability analysis	5.19	(1.52)	15	5.06	(1.60)	19
Responsibility reporting distinguishing between controllable and non-controllable items	5.13	(1.45)	16	4.90	(1.29)	24
Responsibility budgeting	5.12	(1.34)	17	5.08	(1.46)	17
Budgeting for planning financial position	5.09	(1.23)	18	5.37	(1.26)	6
Activity based management (ABM)	5.07	(1.33)	19	4.84	(1.39)	26
Variable costing	5.00	(1.37)	20	4.93	(1.43)	23
Performance evaluation and reward: divisional profit	5.00	(1.67)	21	5.27	(1.29)	9
Sensitivity analysis	5.00	(1.77)	22	4.83	(1.45)	27
Performance evaluation and reward: return on investment (ROI)	4.93	(0.98)	23	5.31	(1.46)	8
Budgeting for day-to-day operations	4.93	(1.22)	24	5.17	(1.24)	15
Performance evaluation and reward: controllable profit	4.90	(1.02)	25	4.77	(1.43)	30
Relevant and irrelevant cost analysis	4.88	(1.23)	26	4.62	(1.21)	34
Cost-volume-profit break-even analysis	4.83	(1.39)	27	5.08	(1.48)	18
Performance evaluation and reward: budget variance analysis	4.82	(1.31)	28	4.95	(1.31)	22
Investment appraisal non-discounting techniques (e.g. Payback, ROI)	4.80	(1.26)	29	4.57	(1.20)	35
Performance evaluation and reward: employee attitudes	4.79	(1.39)	30	4.65	(1.18)	33
Investment appraisal discounting techniques (e.g. NPV, IRR)	4.78	(1.56)	31	4.77	(1.53)	31
Performance evaluation and reward: team performance	4.65	(1.32)	32	4.79	(1.24)	28
Performance evaluation and reward: cash flow return on investment	4.62	(1.26)	33	5.11	(1.59)	16
Performance evaluation and reward: group decision from top management	4.52	(1.53)	34	5.05	(1.44)	20
Performance evaluation and reward: residual income	4.50	(1.16)	35	4.72	(1.70)	32
Activity-based costing (ABC)	4.47	(1.59)	36	4.57	(1.66)	36
Full (absorption) costing	3.87	(1.77)	37	5.24	(1.39)	12
Planning and control: personal business experience and intuitive managerial judgment	3.60	(1.24)	38	4.03	(1.38)	39
Performance evaluation and reward: individual judgment from immediate superior	3.21	(1.96)	39	4.36	(1.69)	38

oriented towards calculating inventory costs and budgeting for costs, with limited expectations of the use of cost data for future decision-making purposes. This finding is consistent with conclusions drawn by Bromwich and Wang (1991) and Skousen and Yang (1988). Firth (1996) suggests that the orientation of management accounting data towards calculating inventory costs may be due to the lack of decision-making responsibilities of SOE managers who are traditionally expected to carry out production plans handed down by the state. Even with the sweeping modernizations and restructuring taking place within SOEs, the findings suggest that management accounting practices may not evolve significantly over the next 3 years.

5. Conclusion and future research directions

This study represents one of the first attempts to examine the adoption, perceived benefits and expected future direction of management accounting practices of SOEs and JVs in the Chinese emerging market economy. We find that SOEs and JVs adopt management accounting practices at significantly different levels. Ownership type also affects the kind of management accounting practices adopted. For example, JVs (with a foreign partner) tend to adopt more Western management accounting practices compared to SOEs. The difference in adoption levels is more pronounced for management accounting practices relating to decision making, planning and control, and responsibility accounting. The difference in adoption rates according to ownership type supports earlier research conclusions drawn by Firth (1996) and (O'Connor, Chow, & Wu, 2004), indicating that foreign-partnered JVs constitute an important vehicle for importing Western management accounting practices into China compared with SOEs that have no foreign involvement. With regard to the perceived benefits obtained from adoption of Western management accounting practices, this study suggests that the practices relating to budgeting for cost control, profit budgeting, sales budgeting and target costing are perceived to be the more beneficial by the senior financial officers of SOEs as compared to those of JVs. However, employees of SOEs perceive less benefits arising from management accounting techniques in respect to decision-support systems, planning and control systems, and performance-evaluation systems based on individual rewards.

In relation to changes in future adoption, the employees of SOEs expect to place more emphasis on sales budgeting, profit budgeting, budgeting for cost control, and target costing and relatively lower emphasis on decision support system practices encompassing cost-volume-profit analysis (rank of 18), activity-based management (26), relevant and irrelevant cost analysis (34), and product service profitability (19).

It appears, therefore, that little has been achieved despite two decades of reforms and modernization. Consistent with the conclusion drawn by (Hassard, Sheehan, & Morris, 1999), government interference in SOE management is still prevalent and pervasive. To further support this point, a respondent from one of the top SOEs noted:

“Due to heavy influences by the old planned economic system, most SOEs do not appreciate the value of the management accounting information. This situation must be improved by increasing the sense of market economy held by the staff and the quality of leadership in SOEs.”

While this study contributes to our understanding of the adoption, perceived benefits and expected future emphasis of management accounting practices in China, further investigation appears warranted. The findings of this study suggest that JVs with a foreign partner tend to adopt more Western management accounting practices compared SOEs. However, the reasons for variations in the adoption of management accounting practices are not fully apparent, particularly at a firm level. Future investigation should explore how firm-specific factors may influence adoption rates in both JVs and SOEs using multivariate regression analysis.

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Motives for fixed-asset revaluation: An empirical analysis with Swiss data

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Abstract

This paper investigates the economic motives of fixed-asset revaluations of Swiss listed companies. We provide international insights on revaluation motives, particularly in a stakeholders' regime, over a period which is characterized by significant changes of the accounting standards relative to fixed-assets valuation. We also test the impact of international stakeholders on the choice of whether to revalue assets. Results from pooled data show positive associations between revaluation and both the proportion of foreign sales and leverage, and a negative association with the investment opportunities. These findings suggest that revaluation is used as a device to improve creditors' and foreign stakeholders' perceptions of the financial health of the firm and thereby improve the firm's borrowing capacity. Cross-sectional results show that although leverage has declined over the periods investigated, interest rates have become lower for firms that revalue upward their fixed assets (compared to non-revaluers), emphasizing the debt-costs hypothesis
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Keywords: Asset revaluation; Information asymmetry; International stakeholders; Leverage; Switzerland

1. Introduction

In several countries (e.g., Australia, Belgium, and the United Kingdom), accounting laws allow the value of fixed assets to be revalued upward—without a previous write-down—at the managers' discretion.¹ Information asymmetry about the firm's assets value should be reduced

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Different countries have different regulations in this area. For example, upward revaluation is strictly forbidden in Canada and the United States but is authorized (under certain conditions) in Australia, Belgium, Spain, France, Hong Kong, Italy, Japan, New Zealand, the Netherlands, Switzerland, and the United Kingdom (Raffournier, Haller, & Walton, 1998, p. 438).

by this departure from the historical cost principle (Brown, Izan, & Loh, 1992, p. 41). Research on the value relevance of this accounting practice in Australia (Easton, Eddy, & Trevor, 1993; Standish & Ung, 1982), in New Zealand (Emanuel, 1989; Courtney & Cahan, 2004), in the United Kingdom (Aboody, Barth, & Kasznik, 1999; Barth & Clinch, 1998), and for Hong Kong firms (Jaggi & Tsui, 2001) provides mixed results.² Given that the choice of whether or not to implement revaluation lies with management, there is good reason to question the motivations underlying a practice that has no direct impact on the firm's cash flow besides implementation costs (e.g., additional audit fees). It is reasonable to think that these costs are compensated (Watts, 1977). It may therefore be interesting to understand the origins of the compensations, in order to comprehend the reasons why managers opt for upward revaluations.

The purpose of this paper is to investigate empirically the economic factors likely to affect fixed-asset revaluation of Swiss listed companies by concentrating on contractual relationships (implicit and explicit). Investigation of the choice of upward asset revaluation—that is, without a previous write-down—in the specific Swiss context is of interest for several reasons. First, and unlike most countries, the Swiss stock exchange market (SWX) has a long tradition of international accounting standards. Until 2005, it used to allow companies to report their financial statements using IFRS, U.S. GAAP or local Swiss GAAP. Accounting standards for assets' revaluation have changed significantly over the last decade (see Section 2). This paper provides insights on managers' revaluation policy in a changing accounting environment. Second, few articles have considered the impact of international stakeholders (i.e., customers, suppliers, and foreign investors) on the firm's accounting-policy choices (Cullinan, 1999; Inoue & Thomas, 1996). Financial statements of firms facing international competition are not exposed to the scrutiny of only local stakeholders. Numerous Swiss listed firms have expanded their activities abroad, providing the opportunity to test the impact of international stakeholders on reporting valuation choice (i.e., historical cost vs. upward revaluation of fixed assets). Third, Switzerland has a concentrated and relatively illiquid stock market that differs from those in "stockholders-oriented" countries (Hilary, 2003), and a small but open economy (Cauchie, Hoesli, & Isakov, 2004). This paper increases understanding of managers' accounting choices, particularly asset revaluation, in such a "stakeholder's regime" where banks play a major role. Indeed, although some empirical works have focused on the economic logic underlying the decision to revalue, most previous studies have been concerned with firms in an Anglo-Saxon environment (i.e., Australia, New Zealand, and the United Kingdom). Only Jaggi and Tsui (2001) in Hong Kong and Gaeremynck and Veugelers (1999) for non-listed Belgium firms offered empirical results—on a manager's motivation to revalue assets—in different institutional and cultural environments.³ Lastly, the accounting literature has extensive research on the associations between a firm's characteristics and its accounting-method choices. Yet, unlike most accounting choices

² To some extent, Nichols and Buerger (2002) found upward revaluation relevant in the debtors-creditors relationship in a German context.

³ Results from prior research that has focused on managers' motives to explain the decision to revalue a firm's assets generally suggest that upward revaluation may be a signaling contracting device to reduce debt costs (Black, Sellers, & Manly, 1998; Brown et al., 1992; Cotter, 1999; Cotter & Zimmer, 1995; Lin & Peasnell, 2000a, 2000b; Whittred & Chan, 1992).

that accelerate or delay the recording of profits (e.g., via discretionary accruals management), effects of revaluation on the financial statements—all things being equal—do not reverse over time. Besides, upward revaluation may have a substantial effect on the financial statements' aggregates.⁴

In order to investigate the rationale underlying upward asset-revaluation choice of the main Swiss listed companies, we derive hypotheses from the Swiss environment.⁵ We argue that revaluation is mainly a device to decrease debt costs, as well as to meet foreign stakeholders' information needs, while it also reflects managers' compensation considerations. It is further hypothesized that upward revaluation is positively associated with a firm's leverage ratio, its level of export sales, and negatively associated with the firm's ownership diffusion. The empirical analysis is based on univariate tests and Logit-type regressions on Swiss listed firms from the years 1994, 1997, 2000, and 2004 (using both pooled and cross-section data). The four years were selected to capture the significant accounting changes Swiss firms have experienced over the last decade. Results from the pool regression suggest that the leverage ratio and the ratio of foreign sales to total sales are positively associated with upward revaluation of fixed assets, whereas investment opportunities are negatively associated. For the most part, these observations are supported with a cross-sectional analysis (using both univariate and multivariate analyses) which also exhibits that although leverage decreased for both groups of firms (revaluers vs. non-revaluers), interest rates have become lower for firms that revalued upward their fixed assets. This latter result emphasizes the debt-costs hypothesis.

The paper is organized into the following sections. The next section describes the accounting context in Switzerland and examines the issues associated with revaluation, the third develops the hypotheses, the fourth presents the research design, the fifth discusses the main statistical results and the sixth offers a conclusion.

2. Accounting for asset revaluation in Switzerland

Switzerland follows the continental European model of a legal approach to accounting standard settings, as its accounting regulation is mostly of legislative origin. Firms' accounting choices must be consistent with the legal rules set out in the Swiss Company Law (Code des Obligations, hereafter CO),⁶ which used to give firms considerable flexibility with regard to publication of information—the CO contains very few accounting principles or rules. As a result, Switzerland, although it was one of the world's most highly industrialized countries, was considered to be underdeveloped from the accounting standpoint (Zünd, 1993, p. 257). The situation has changed significantly in recent years. In 1984 the Swiss Institute of Certified Accountants created the Foundation for Recommendations concerning the Presentation of Accounts, known in Switzerland by its German acronym FER, for *Fachkommission für Empfehlungen zur Rechnungslegung*. The FER is a Swiss accounting standardization board modeled on the American FASB

⁴ Under IFRS, revaluation cannot apply to a given isolated asset only, but must encompass all assets in a given class, which increases the overall value involved.

⁵ Hypothesis developments from prior studies are also used when non-context specific.

⁶ The generally accepted accounting rules and principles in Switzerland are set out in sections 662 to 673 of the CO.

(Financial Accounting Standards Board). Its mission is to draw up recommendations (i.e., the Swiss GAAP FER) that intend to improve the quality and comparability of financial statements and help bring accounting practices into line with international standards (FER's standards apply mostly to consolidated accounts). The CO, which dates from 1881, was revised in depth in 1992, with emphasis on standardization of annual accounts, in respect of which it now contains a number of rules (art. 663 and 663a). Since October 1996, firms listed on the Swiss Stock Exchange (Swiss Exchange: SWX) must also comply with the Swiss GAAP FER (Accounting Rules Recommendation), the IFRS (International Financial Reporting Standards), or the U.S. GAAP, as well as with the CO. These new SWX rules merely confirmed a *de facto* situation, in that Switzerland's listed companies already voluntarily published their group accounts in accordance with recognized standards or standards consistent with generally accepted practices (Dumontier & Raffournier, 1998), such as the IFRS, Swiss GAAP FER, U.S. GAAP, or European Directives.⁷

Besides U.S. GAAP, all available accounting standards – for Swiss listed companies – allow some form of upward revaluation. At the legislative level, except for the specific case of losses of half the capital stock and reserves (art. 670 CO), the CO prohibits revaluations in individual accounts but authorizes them in consolidated accounts. The CO does not, however, provide any guidelines relative to the accounting for upward revaluation. Instead, it invites managers to follow recognized GAAP for the reporting of consolidated accounts (art. 663 CO). Managers of Swiss listed firms may then prepare consolidated financial statements with upward revaluation of fixed assets under the other accounting references required by the SWX (i.e., Swiss GAAP FER and IFRS). Indeed, Switzerland's own standard, Swiss GAAP FER No. 5 "Valuation Principles for Group Accounts," authorizes both the historical-cost method and the fair-value method in consolidated accounts, and it does not state a preference. The accounting treatment of upward revaluation is stipulated in Swiss GAAP FER No. 18, "Tangible Fixed Assets." Firms may measure their tangible fixed assets at the "actual values" (FER 18, §8). This standard is similar to the one of IAS 16, "Property, Plant and Equipment" (*International Accounting Standards*) in terms of revaluation.⁸ Thus, under IFRS and Swiss GAAP, a company may choose the revaluation model as its accounting policy for PPE (Property, Plant & Equipment) after the initial recognition. As stipulated, PPE may be revalued at fair value (at the date of the revaluation), normally appraised by professionally qualified valuers (IAS 16, §32). The revaluation of assets should then be made with sufficient frequency (IAS 16, §34; FER 18, §10), and it should concern the entire class of PPE to which the assets belong (IAS 16, §37). Upward revaluation is recorded first by measuring the difference between the fair value of the assets and their book value. The revaluation difference is then added to the net book value of the assets and to the firm's equity capital as a revaluation surplus. If the revalued assets are depreciable, depreciation is recorded in the income statement. Where the difference between the fair value of an asset and its net book value is negative, the asset is depreciated by the same amount. When revalued assets are derecognized, the revaluation surplus may

⁷ Because Switzerland is not a member of the European Union, all references to the European Directives in Swiss firms' annual accounts were, and still are, entirely voluntary.

⁸ Swiss GAAP FER No. 9 provides the accounting rules for intangible assets, which do not allow upward revaluation.

be transferred to the retained earnings (IAS 16, §41; FER 18, §13), or instead it could be “dissolved to profit” (FER 18, §13).⁹

Effective for financial statements covering periods beginning on or after 1 January 2001, the new version of Swiss GAAP FER No. 18, “Tangible Fixed Assets,” and IAS 40, “Investment Property” (i.e., lands or buildings held to earn rentals or for capital appreciation), may have affected the overall revaluation policy as they require the isolation of investment properties from fixed assets before implementing a revaluation method (if desired). Thus, the new and revised IAS 16 does not apply to fixed assets considered as mere investments, which reduces the scope of the revaluation policy. The rationale of IAS 40 is different from IAS 16, in that it requires that either upward revaluation be recorded in the income statement (instead of equity capital) or it stays at the historical cost.¹⁰ In order to be consistent over the four years considered, this paper investigates the revaluation under IAS 16 only.

3. Background and explanatory factors

Asset revaluation allows firms to take into account changes in the fair value of some assets when determining their carrying amounts in financial statements. The need to revalue certain non-current assets has its roots in the debate over the effects of changing prices. Some firms revalue their assets within the scope of inflation accounting standards (Griffiths, 1990). A firm may also consider upward revaluations to reveal its true economic and financial situation to investors. Where it is clear that an asset's book value is far different from its fair value, management should make the relevant adjustment in order to reduce information asymmetry (Brown et al., 1992), even if this means increasing the book value of the asset in question.

The debate relative to such departure from the historical cost principle is ongoing (Aboody et al., 1999; Lin & Peasnell, 2000a, 2000b). The principle of conservatism dictates that firms should consider only those events likely to reduce asset values, eliminating any upward valuations. Moreover, upward revaluations generate more in terms of direct costs (as discussed below) than they contribute in terms of business image: following this logic and according to Henderson and Goodwin (1992), accounting standards should prohibit them.

⁹ Under both IAS 16 and FER 18, the amount in the revaluation surplus may change for three reasons: (a) As a result of a revaluation, an increase of the carrying amount of an asset shall be credited directly to the revaluation surplus (or in profit or loss to the extent it reverses a revaluation decrease of the same asset previously recognized in profit and loss) (IAS 16, §39; FER 18, §13); (b) As a result of a revaluation, a decrease of the carrying amount of an asset shall be recognized directly to the revaluation surplus to the extent of any credit balance existing in the revaluation surplus of the assets (or directly in profit or loss in the absence of any credit balance of a revaluation surplus of the same assets) (IAS 16, §40; FER 18, §13); (c) When the revalued asset is derecognized, the revaluation surplus shall be transferred directly to retained earnings (and not through profit and loss) (IAS 16, §41; FER 18, §13).

¹⁰ IAS 40 allows the choice between two valuation methods: a cost model and a fair-value model. With this latter approach, “investment should be measured at fair value and changes in fair value should be recognised in the income statement” (IAS 40, §5a). It is thus stipulated that “The fair value model differs from the revaluation model that the Board already permits for certain non-financial assets. Under the revaluation model, increases in carrying amount above a cost based measure are recognised as revaluation surplus. However under the fair value model, all changes in fair value are recognised in the income statement” (IAS 40, §6). The new FER 18, §14 is similar to the IAS 40 but leaves open the choice between the recognition of the fair-value changes in the income statement or in stockholders' equity (i.e., revaluation reserve).

Upward fixed-asset revaluation generates a certain number of direct costs. One is the cost of obtaining an estimate of the fair value of the assets in question. In some cases, higher audit fees could be expected, for example where auditors have to verify the assumptions the company made when estimating internally the fair value of assets. Certain difficult-to-measure costs also result from the time spent in discussions and negotiations between auditors and management on the new asset value to be recorded (Brown et al., 1992, p. 37). Some indirect effects can arise from the lasting impact of revaluation on all the firm's financial statements.¹¹ The published amounts may affect the decisions of some stakeholders in their relationship with the firm.

The empirical literature offers a number of factors to explain the revaluation decision in different contexts and environments. First, in Australia, the United Kingdom, and to some extent Hong Kong, upward revaluations help avoid violations of debt covenants, restricting debt levels (Brown et al., 1992; Cotter, 1999; Whittred & Chan, 1992) while improving the firm's ability to obtain new loans because the firm can report a lower debt ratio as a result of its higher asset value (Black et al., 1998; Brown et al., 1992; Cotter, 1999; Cotter & Zimmer, 1995; Jaggi & Tsui, 2001; Lin & Peasnell, 2000b). In such a context, and given that outside financing is more costly for firms composed mainly of investment opportunities than for those composed mainly of assets-in-place, it appears that the managers of the former have more reasons to implement upward asset revaluation (Brown et al., 1992; Whittred & Chan, 1992). Second, revaluations also serve to dissuade hostile takeover bids. If revaluation allows a firm to bring its book value into line with its fair value, this move lowers the probability of a successful under-value bid (Brown et al., 1992; Easton et al., 1993). Third, by reducing the return on equity and the return on assets, upward revaluation reduces the political costs borne by firms (Brown et al., 1992). Fourth, in the United Kingdom and prior to 1993, when gain from a sale of fixed assets could be calculated based on historical cost and flow through the income statement, revaluation could be part of an overall earnings management policy (Black et al., 1998). Fifth and last, managers may implement upward revaluation simply to report the fair value of the firm's assets. For example, Aboody et al. (1999), in the United Kingdom, and Jaggi and Tsui (2001), in Hong Kong, have both shown a positive link between upward asset revaluation and the firm's future performance, suggesting that the managers' choice was actually motivated by asset-value-modification considerations.¹² Within a Swiss context, several factors are also likely to influence managers' accounting decisions.

3.1. *Leverage*

The Swiss credit market is well developed, although, since the collapse of real estate prices in the early 1990s, its banking sector has experienced an important consolidation process (Hertig, 1997; Rime and Stiroh, 2003). The handful of banks that dominate the credit market (i.e., Credit Suisse, UBS, and Kantonal Banks) may find themselves in a dominant or even occasionally a monopoly position vis-à-vis corporations seeking external financing, which

These effects increase in proportion to the variation between the fair value and the book value of the assets, and they are larger as revaluation frequency declines.

¹² Gacemynck and Veugeliers (1999) conclude that revaluation is a negative signal in Belgium. They develop an analytical model that suggests that poorly performing firms benefit more than others from upward asset revaluation. Their empirical tests on unlisted Belgian firms appear to confirm their analyses, but only for a somewhat volatile industry.

could lessen the firms' bargaining power. Creditors use accounting information to analyze a firm's financial standing and assess the risk they would be taking when granting credit or agreeing to a loan. Managers seeking to reduce financing costs may influence the accounting decisions to reduce the perceived risk of creditors, and thus reduce debt costs. Swiss bank loans may be priced and may contain restrictive debt covenants according to the debtor's financial standing (Missonier-Piera, 2004).¹³ Indeed, one of the main concerns of creditors is the risk of reducing or diluting the guarantees offered by the firm's assets in case of bankruptcy, which is positively correlated to the firm's leverage. Managers (acting on behalf of shareholders) will try to reassure creditors by opting for an upward revaluation policy for their fixed assets. This choice will not only reduce information asymmetry about the assets' fair value but also will reduce leverage ratios and the related perceived bankruptcy risk. Results from Nichols and Buerger (2002) indicate that bankers (in Germany) would grant significantly larger loans to firms reporting their financial statements with fixed assets at fair values instead of historical cost. This suggests that creditors may prefer such a revaluation practice, or at least that it is appropriate for debtors to present fixed assets at revalued amounts in their financial statements. This accounting choice becomes more relevant as the firm's debt level increases and as the firm moves closer to its contractual limits (Begley, 1990).

H1. The higher the firm's leverage, the more likely it is that its managers will use upward fixed-asset revaluation.

3.2. *Ownership control status*

The Swiss stock market is concentrated and relatively illiquid (Cornier, Magnan, & Morard, 2000; Faccio & Lang, 2002; Hail, 2002). Most corporations, including some of the biggest, are owned and controlled by a small number of shareholders, and the general public owns only a small fraction of the firms' stocks (Schmid & Burkhard, 1997). Köke (2004) provided empirical evidence that changes in control—due to poor performance—may play a disciplinary role in a bank-based economy (i.e., like that of Switzerland), although the probability of changes in control is reduced as ownership concentration increases. The ownership structure of the firm may then affect managers' accounting method choices. Indeed, senior managers have considerable discretionary power over the firm's management—in particular, regarding the publication of information on its performance (Williamson, 1967, p. 13)—in firms where the cost of controlling managerial activities is high. This particularly tends to be the case in firms with diffuse shareholdings (Salamon & Smith, 1979; Dhaliwal, 1988; Hall, 1993). Managers of firm with such agency problems may select accounting methods in order to convince shareholders that the firm's performance is satisfactory in order to increase managerial compensation, or at least give a flattering image of the firm (Donnelly & Lynch, 2002).¹⁴ even though this favors appearance over fair disclosure (Vafeas, 2005). Hence, Elston and Goldberg (2003) find a positive association between the level of executive

¹³ "Deal Scan" from Loan Pricing Corporation (a private worldwide database) provides such detailed information on some Swiss private-debt agreements.

¹⁴ This should discourage hostile takeover bids by ensuring that existing shareholders do not wish to sell their shares. Such practices should be all the more relevant in a market with a low ratio of firms' owners (i.e., the main shareholders) to managers, as the competition between these latter is stronger (Williamson, 1975).

compensation and both firm profitability measures and ownership dispersion for firms in Germany (i.e., a country close to Switzerland in terms of corporate-governance attributes). Upward revaluation decreases accounting profitability measures,¹⁵ leading us to expect:

H2. The more diffused the ownership of the firm, the less likely it is that its managers will use upward fixed-asset revaluation.

3.3. *International stakeholders*

According to the Swiss Federal Office of Statistics, exports represented 28%, 32%, 37% and 42% of GDP in 1994, 1997, 2000, and 2004, respectively. On the Swiss stock market, a large proportion of firms are exposed to foreign economic conditions (Cauchie et al., 2004). In addition, due to the relatively small size of the Swiss market, numerous listed firms have expanded their activities abroad and have sought external funds on foreign financial markets (i.e., on foreign exchanges) to finance their expansion. A firm engaged in international activities has to provide information not only to its domestic stakeholders – such as investors, creditors, and customers – but also to those from abroad. Very few articles have considered the impact of international stakeholders on accounting-methods choice (e.g., Cullinan, 1999). Financial statements of firms facing international competition, however, are exposed to the scrutiny of local and international stakeholders, both of whom may affect managers' accounting decisions. From abroad, Swiss companies may be perceived as more risky than local firms. Not only do users of financial information (e.g., foreign customers) have to convert the financial statements into their local currency, but they also do not share the same amount of information and do not have the same expertise and knowledge about the firm (e.g., its business history) as financial statement users from Switzerland. Swiss firms have, therefore, an incentive to enhance their perceived financial strength by reducing information asymmetry. Upward revaluation may be a device to achieve this goal, especially when this practice may be well perceived in some neighbor countries and significant economic partners, such as Germany (Nichols & Buerger, 2002). We may then expect that:

H3. The higher the level of a firm's export sales, the more likely it is that its managers will use upward fixed-asset revaluation.

3.4. *Investment opportunities*

Myers (1977) claimed that a firm is composed of assets-in-place (whose value is easily identifiable) and growth (or investment) opportunities (whose value depends on future

¹⁵ The increase of managers' compensation may result from the presence of a bonus (for example). Indeed, the literature in the area assumes that – in order to monitor managers' activities more effectively – the presence of a bonus plan within the firm is positively associated with more diffused ownership of firms (Salamon & Smith, 1979; Dhaliwal, Salamon, & Smith, 1982). Managers' compensation contracts are difficult to obtain for Swiss corporations, however. The few bonus plans identified (in Switzerland) seem to leave shareholders some latitude in fixing the amount of managers' bonus payments (Pratt & Bher, 1989, p. 20). The scarcity of compensation contracts available for study and the difficulty in obtaining them may result simply from the relatively highly concentrated ownership structure of the Swiss stock market, which – according to the literature – should be negatively associated with the presence of such contracts.

discretionary investments). Investment opportunities may have two countervailing associations with asset-revaluation policy. (a) On the one hand, by definition, firms composed mainly of investment opportunities have fewer assets-in-place. From this perspective, these growth firms have fewer possibilities than firms composed mainly of assets-in-place to revalue their assets upward. Indeed, fixed-asset revaluation may concern only existing assets (i.e., assets-in-place). (b) On the other hand, managers of firms composed mainly of growth opportunities are better acquainted with their value than are outside investors, due to information asymmetry (i.e., the asset value is difficult to appraise). It is, therefore, more difficult to control the activities of growth firms than it is to control the activities of firms composed mainly of assets-in-place. For creditors, the presence of investment opportunities generates a problem of underinvestment and of asset substitution¹⁶ (Galai & Masulis, 1976). Creditors will then perceive such growth firms as more risky, and they will have higher expectations in terms of financial health.¹⁷ This gives an incentive to opt for upward revaluation of fixed assets (Whittred & Chan, 1992), along with the need to reduce information asymmetry with potential investors (Brown et al., 1992). Because of these two opposite arguments, it is difficult to make a prediction *a priori* about the sign of the association between investment opportunities and upward revaluation of fixed assets.

H4. The importance of the firm's investment opportunities is associated with the use of upward fixed-asset revaluation.

4. Research design

4.1. Sample selection

The sample is composed of industrial and commercial firms listed on the Swiss Stock Exchange (SWX) for the four distinct periods of 1994, 1997, 2000 and 2004; only firms that do not report their financial statements under U.S. GAAP are included. The time periods are not selected arbitrarily. Use of these four periods captures the accounting changes that have occurred over the last decade in Switzerland. The year 1994 takes into

¹⁶ The first risk is the potential risk of underinvestment. By definition, managers will decide at the appropriate time whether or not to proceed with the investment (i.e., to take up the investment opportunity). They will not make the investment if its net present value – even if positive – is less than the amount the firm must repay to its creditors, generating a problem of underinvestment. The second risk arises from the possibility that manager-shareholders may undertake projects that are more risky than those for which creditors granted the loan (Galai & Masulis, 1976). This is because the additional gain resulting from the increase in risk will benefit the shareholders only, not the creditors, who receive a fixed amount. The capacity to substitute assets is greater if the firm is composed mostly of growth opportunities rather than assets-in-place. As a result, creditors consider growth opportunities to be more risky than assets-in-place.

In addition, given the conservatism of accounting valuations, accounting data are very poor indicators of the firm's performance where the firm is composed mainly of growth opportunities (Smith & Watts, 1991). It is reasonable to suppose that the use of loan covenants and manager-compensation contracts based on accounting data is more likely in firms composed mainly of assets-in-place. Skinner (1993) concluded from this that the managers of such firms have more incentives than others to select accounting methods that speed up profit accounting in order to maximize their own compensation or comply with loan covenant provisions.

account the last 1992 review of the CO, which came into force on 1 July 1993. Moreover, IAS 16, revised in 1993 and applicable to years beginning on or after 1 January 1995, became more restrictive, requiring for example that revaluations take place at regular intervals and that assets be valued by professionals.¹⁸ Since October 1996, firms listed on the SWX have had to comply with Swiss GAAP FER, U.S. GAAP, or IASB standards in addition to the CO. The year 1997 is chosen to test the effect of the new requirement of the SWX on managers' reporting of valuation choice. The year 2000 allows control for regularity over time relative to managers' accounting decisions, as well as the ability to disregard the introduction of IAS 40, on "Investment Property." The year 2004 allows us to examine the revaluation policy after the implementation of the new IAS 16 and IAS 40. The sample firms all published consolidated accounts because the CO prohibits revaluations in individual accounts. This constraint also allows the analysis to ignore the fiscal impact of accounting decisions, because a major characteristic of Swiss accounting practices is compliance with *Massgeblichkeitsprinzip*. This "Authoritative Principle" simply states that commercial accounts are directly linked with accounts for tax purposes (Achleitner, 1998).¹⁹

The data set was collected manually from all annual reports of industrial and commercial listed companies (excluding financial and government institutions) available at the Universities of Geneva and Lausanne (Switzerland). Among them, 103, 97, 103, and 124 firms disclosed all necessary information (for the years 1994, 1997, 2000, and 2004, respectively), and 30, 22, 17, and 15, respectively, resorted to upward revaluation of fixed assets for the reporting of their consolidated financial statements. This sample selection represents 65%, 74%, 82%, and 92% of all industrial and commercial listed companies in terms of market capitalization in Switzerland for the 1994, 1997, 2000, and 2004, respectively (excluding financial and government institutions). According to annual reports, land and properties (until 2001) were the types of assets most involved in revaluations. For firms that revalue upward their fixed assets, on average revaluation represents (respectively for 1994, 1997, 2000 and 2004) 26%, 16%, 8% and 17% of their fixed-asset values (without revaluation).

4.2. Variable measurement

The accounts of the sample firms are recalculated to take into account the impact of revaluation on the measures of the independent variables. The reprocessing consists of establishing the values of the financial statements' aggregates that would exist in the absence of the upward revaluation. Several methods can be used to measure the leverage ratio. We use, as did Brown et al. (1992), the total of financial debt to total assets (LEV). Ownership diffusion (OD) is measured by one minus the percentage of voting rights held by the known major shareholders. This variable is thus continuous. The firm's ownership structure is likely to determine both managerial behavior and the nature of managers'

¹⁸ In addition, annual reports from prior years were not available for many companies or did not provide sufficient information for the testing of the hypotheses.

¹⁹ The IFRS and the Swiss GAAP FER are used for group accounts and not for tax purposes. Tax accounting uses its own rules, generally based on the rules set out in the CO, that is, the Swiss Company Law (Oberson, 1998).

Table 1

Independent variables (financial statements at historical cost exclusively –, or with upward fixed-assets revaluation +)

Leverage (expected sign: +)

$$LEV = [\text{total financial debt} / \text{total assets}]$$

Ownership diffusion (expected sign: –)

$$OD = [100 - \text{voting rights of the main known shareholders}]$$

International pressure (expected sign: –)

$$EXPORT = [\text{total foreign sales} / \text{total sales}]$$

Investment opportunities set (expected sign: ±)

$$IOS = [\text{firm market value} / \text{firm book value}]$$

Control variables

$$SWX = [1 \text{ if listed in Switzerland only}; 0 \text{ if cross-listed}]$$

$$SIZE = \log [\text{total sales}]$$

$$INTEREST = [\text{interest expenses} / \text{average financial debt}]$$

Total financial debt = (short-term debt and current portion of long-term debt) + long-term debt.

Firm market value = market capitalization at year end + financial debt.

Firm book value = total assets.

compensation contracts. Hypothesis 2 suggests that managerial corporations²⁰ select accounting methods that tend to enhance company performance results. The measure used for this research is similar to that used by Hall (1993) and Dumontier and Raffournier (1998). The pressure from international stakeholders is measured with the percentage of sales outside Switzerland (EXPORT). Investment opportunities (IOS) are measured by the market-to-book ratio.²¹ Finally, the analysis also includes control variables such as the size (SIZE) of the firm, its listing status (SWX), its interest rate (INTEREST) and its industry sector. Most empirical research uses either total assets or sales as a measure of firm size (Bujadi & Richardson, 1997). A total sale (SIZE) has the advantage of not being affected by the accounting choices tested in the study described here. To limit the amplification effects of a small number of extreme values, the decimal logarithm of total annual sales is used as a measure of size. Listing status is controlled with a dummy variable (SWX) that takes the value one if the firm is listed on the SWX only and the value zero if it is also listed on a foreign stock exchange. The interest rate (INTEREST) is the ratio of interest expenses over the mean of financial debt between two fiscal periods. The firms are grouped in six industry sectors: agricultural and natural resources, manufacturing industries, transportation, consumer and non-consumer goods, real estate, and services. Table 1 shows all the proposed measures, and Table 2 presents the descriptive statistics.

According to the criteria of Mosen and Downes (1965), a firm is a managerial corporation if none of the shareholders has more than 5% of the voting rights. Otherwise, one shareholder is able to exercise effective control over managerial activity. Others (Dhaliwal et al., 1982; Dhaliwal, 1988) consider firms to be shareholder corporations if a shareholder owns more than 10% of the firm's capital stock, or if a group of shareholders owns more than 20%. In all other cases, firms are considered to be managerial corporations.

We also used the Tobin's Q instead of the market-to-book ratio as a proxy for IOS. With sufficient data, the results are not affected by this other proxy. Tobin's Q has the advantage of not being affected by the accounting choice tested in this study. Yet, because it requires a long history of financial statements to be computed, too many observations would be dropped for 2004 (many newly listed companies) and 1994 (many companies with an absence of prior financial statements). The Tobin's Q was measured following the modified version of Lewellen and Badrinath (1997) proposed by Lee and Tompkins (1999) which provides a method to estimate the replacement cost of the fixed assets.

Table 2
Descriptive statistics (pooled data)

Variable	Mean	Standard deviation	First quartile	Median	Third quartile
LEV	0.2730	0.1551	0.1475	0.2724	0.3725
OD	0.3680	2.8678	0.2910	0.4900	0.7115
EXPORT	0.5100	0.3270	0.2600	0.5500	0.8100
IOS	1.0858	1.3816	0.4469	0.7259	1.1616
SWX	0.8600	0.3420	1.0000	1.0000	1.0000
SIZE	4.8661	1.6131	3.4681	5.4413	5.9960
INTEREST	0.0379	0.0197	0.0197	0.0373	0.0535

LEV is the total financial debts-to-total-assets ratio. SIZE and OD are respectively the logarithm of total sales and one minus the percentage of voting rights of the main known shareholders. IOS is the market-to-book ratio. EXPORT is the ratio of foreign sales to total sales. SWX takes the value zero for cross-listing status and one otherwise. INTEREST is the total interest expenses of a year/average financial debt of the same year.

The general form of the empirical models is as follows:

$$Y_i = \alpha_0 + \alpha_1 LEV_i + \alpha_2 OD_i + \alpha_3 EXP_i + \alpha_4 IOS_i + \alpha_5 Control_i \\ i = 0, 1 \text{ and } j = 1, 2, 3$$

Y_i represents the effect of accounting choice: zero if the firm chooses the historical cost-valuation principle and one if the firm opts for upward revaluation of fixed assets. A pooled-data analysis is first carried out, followed by a cross-sectional analysis to examine in more details any year effects.

5. Empirical results

5.1. Pooled-data analysis

Because the dependent variable is dichotomous, the analysis is based on a *Logit* model regression. Pearson correlation matrix does not exhibit significant correlation between explanatory variables, besides IOS and LEV. The specification of the model takes into account fixed year and industry effects with dummy variables. The correlation matrix of coefficients is presented in Table 3 and the logit model's results are presented in Table 4.

The model is statistically significant and offers classification superior a naive model (χ^2 of 57.81 and *Pseudo R*² of 30.3%). The leverage (LEV) coefficient is statistically significant and with the expected positive sign, supporting H1. This suggests that highly leveraged firms have an incentive to select accounting-method choices that decrease their perceived leverage ratios, thus signaling additional available borrowing capacity to creditors. This result is consistent with findings obtained in Australia, the United Kingdom, and New Zealand by most of the authors who have studied asset revaluation (Black et al., 1998; Brown et al., 1992; Cotter, 1999; Cotter & Zimmer, 1995; Lin & Peasnell, 2000a,b; Whittred & Chan, 1992). Courtney and Cahan (2004) found that revaluation is not value relevant for New Zealand firms that exhibit a high leverage ratio.

Results relative to international stakeholders (i.e., firms engaged internationally) are as expected. The coefficient of the variable EXPORT (foreign sales) is significant and positive

Table 3

Pearson correlation coefficients (pooled data)

	LEV	OD	EXPORT	IOS	SWX	SIZE	INTEREST
LEV	1.000						
OD	0.006	1.000					
EXPORT	-0.035	0.052	1.000				
IOS	-0.303***	0.014	0.130**	1.000			
SWX	0.109**	-0.025	-0.141***	-0.099**	1.000		
SIZE	0.054	-0.042	0.247***	-0.019	-0.232***	1.000	
INTEREST	0.017	0.051	-0.021	-0.059	0.009	-0.099**	1.000

*, **, ***: statistically significant at the 10%, 5%, and 1% level respectively. LEV is the total financial debts-to-total-assets ratio. SIZE and OD are, respectively, the logarithm of total sales and one minus the percentage of voting rights of the main known shareholders. IOS is the market-to-book ratio. EXPORT is the ratio of foreign sales to total sales. SWX takes the value zero for cross-listing status and one otherwise. INTEREST is the total interest expenses of a year/average financial debt of the same year.

(at the 1% level). This result confirms the expectations from H3, differing from prior Canadian results but similar to those from Japan. Cullinan (1999) argued that international exposure (export sales) should lead to selecting an income-increasing accounting policy for

Table 4

Logit regression: pooled data

Variable	Expected sign	Coefficient	Std. err.	Student <i>t</i>	<i>P</i> > <i>t</i>
LEV	-	2.4789	1.0079	2.46	0.014
OD	-	0.0474	0.1617	0.29	0.769
EXPORT	-	1.0497	0.4410	2.38	0.017
IOS	-	-1.1699	0.3376	-3.46	0.001
SWX	-	0.2732	0.5050	0.54	0.589
SIZE	-	-0.5350	0.2384	-2.24	0.025
INTEREST	-	1.9889	3.9914	0.50	0.618
Year 1997		-0.0888	0.4678	-0.19	0.849
Year 2000		-0.2204	0.4458	-0.49	0.621
Year 2004		-1.8715	0.9215	-2.03	0.042
Industry 2		-0.4154	0.8775	-0.47	0.636
Industry 3		-1.6137	1.0005	-1.61	0.107
Industry 4		-1.0002	0.9502	-1.05	0.292
Industry 5		0.7246	1.1845	-0.61	0.541
Industry 6		-0.8897	0.9970	-0.89	0.372
Constant		1.8311	1.9718	0.93	0.353
Sample size					427
Model significance χ^2					57.81***
% correctly classified					84.3%
Native classification					68.7%
Pseudo R^2 (Nagelkerke)					30.3%

***: statistically significant at the 1% level. The independent variable is 0 when financial statements are based on historical costs exclusively, and 1 otherwise (i.e., with upward asset revaluation). LEV is the total financial debts-to-total-assets ratio. OD is one minus the percentage of voting rights of the main known shareholders. EXPORT is the ratio of foreign sales to total sales. SIZE is the logarithm of total sales and IOS is the market-to-book ratio. SWX takes the value zero for foreign exchange listing and one otherwise. INTEREST is the total interest expenses of a year/average financial debt of the same year.

Canadian companies. Inoue and Thomas (1996) considered that Japanese firms with significant export sales support more political costs than others, and therefore should select accounting methods that decrease earnings. The result in the present study suggests that firms engaged internationally should have managers who select an accounting policy that enhances the perceived financial strength of the firm. Upward asset revaluation is preferred as a policy that enhances the firm's perceived financial situation by reducing leverage ratios.

The coefficient for the IOS variable, measuring investment opportunities (relative to H4), is statistically significant at the 1% level. This result is contrary to those obtained by Whittred and Chan (1992) and Brown et al. (1992) in Australia, although it corroborates the results of Lin and Peasnell (2000a,b) in the United Kingdom, although in Cotter and Zimmer (1995) and Cotter (1999) this variable is not statistically significant. There are three possible explanations for such a result. First, although investment opportunities are slightly and negatively correlated with leverage, firms composed of assets-in-place are likely to revalue upward those assets that can be revalued. They cannot revalue assets they don't yet have (that is, as-yet-unrealized investment opportunities). Second, estimating the value of a firm composed mainly of investment opportunities is costly because the value of its assets is difficult to appraise. As observed by Gaver and Gaver (1993) and Skinner (1993), there appears to be a negative link between the quantity of growth opportunities and the use of accounting data in the firm's covenants. Hence, there is less incentive to select a particular accounting method because it will have little impact on the firm contracts. Third, managers may prefer not to damage their profitability measures (with upward revaluation), given the level of risk of their firm (i.e., composed mainly of investment opportunities).

Lastly, firm size (SIZE) is negatively associated with upward revaluation. Thus, smaller firms are more likely to select upward revaluation (the coefficient is statistically significant at the 5% level), perhaps because having less bargaining power with creditors, smaller firms may be more prone to revalue their fixed assets upward their fixed assets. No other control variables appear to be significantly associated with the revaluation policy, besides the year 2004. Cross-sectional analysis may provide more detailed insights into the motives for selecting a particular revaluation policy and help control for regularity over the years examined.

5.2. Cross-sectional analysis

The cross-sectional analysis relies on univariate and multivariate tests. For the univariate tests, the difference in the means of the two groups (revaluers vs. non-revaluers) is tested using the Student parametric test (*t* test) and the Mann–Whitney nonparametric test (*U* test). The use of a nonparametric test is justified given that, *a priori*, there is no reason to consider a particular form for the independent variable distribution curve. The multivariate analysis uses the same specification as with pooled data (without year effects).

The results reported in Tables 5 and 6 confirm the validity of the hypotheses concerning the choice of valuation principles for leveraged firms, the investment-opportunity sets, and to a lesser extent the international pressure for the first three years under investigation. The results validate the importance of leverage (LEV), which is significantly associated with the choice of the firm's financial statement's valuation principle. Firms preparing their financial statements with upwardly revalued assets exhibited a higher leverage ratio than firms using historical costs entirely. Firms with the highest ownership diffusion (OD) are

Table 5
Univariate test results

Variables	2000				1997				1994			
	Mean	Rank	Tests	Mean	Rank	Tests	Mean	Rank	Mean	Rank	Tests	Tests
LEV ^a	$\mu_0 = 22.5$ $\mu_1 = 23.5$ $\mu_0 = 57.9$ $\mu_1 = 44.7$ $\mu_0 = 52.0$ $\mu_1 = 19.4$ $\mu_0 = 1.25$ $\mu_1 = 0.90$	$R_0 = 62.4$ $R_1 = 62.8$ $R_0 = 63.6$ $R_1 = 46.0$ $R_0 = 61.7$ $R_1 = 29.6$ $R_0 = 63.7$ $R_1 = 53.2$	$t = 0.25$ $Z = 0.04$ $t = 1.84^*$ $Z = -1.81^*$ $t = 3.70^{***}$ $Z = -3.51^{***}$ $t = 2.45^{***}$ $Z = 1.06$	$\mu_0 = 20.4$ $\mu_1 = 32.6$ $\mu_0 = 53.3$ $\mu_1 = 47.7$ $\mu_0 = 51.6$ $\mu_1 = 66.6$ $\mu_0 = 1.86$ $\mu_1 = 0.64$	$R_0 = 48.0$ $R_1 = 72.2$ $R_0 = 53.0$ $R_1 = 46.6$ $R_0 = 58.4$ $R_1 = 76.4$ $R_0 = 56.2$ $R_1 = 30.3$	$t = 3.67^{***}$ $Z = 3.05^{***}$ $t = 0.78$ $Z = 0.80$ $t = 1.96^*$ $Z = 1.95^*$ $t = 4.48^{***}$ $Z = 3.26^{***}$	$\mu_0 = 24.1$ $\mu_1 = 34.9$ $\mu_0 = 49.6$ $\mu_1 = 48.0$ $\mu_0 = 50.5$ $\mu_1 = 72.2$ $\mu_0 = 1.08$ $\mu_1 = 0.63$	$R_0 = 43.2$ $R_1 = 63.9$ $R_0 = 48.5$ $R_1 = 46.2$ $R_0 = 43.8$ $R_1 = 61.9$ $R_0 = 50.8$ $R_1 = 38.4$	$t = 3.70^{***}$ $Z = 3.08^{***}$ $t = 0.24$ $Z = 0.34$ $t = 3.33^{***}$ $Z = 2.70^{***}$ $t = 2.47^{***}$ $Z = 1.85^*$	$\mu_0 = 26.7$ $\mu_1 = 37.4$ $\mu_0 = 45.8$ $\mu_1 = 49.8$ $\mu_0 = 53.03$ $\mu_1 = 49.8$ $\mu_0 = 73.2$ $\mu_1 = 35.9$	$R_0 = 45.6$ $R_1 = 63.7$ $R_0 = 50.8$ $R_1 = 54.8$ $R_0 = 52.8$ $R_1 = 50.0$ $R_0 = 58.3$ $R_1 = 36.5$	$t = 3.21^{***}$ $Z = -2.84^{***}$ $t = 0.71$ $Z = 0.62$ $t = 0.47$ $Z = 0.43$ $t = 4.19^{***}$ $Z = 3.36^{***}$
Control												
SWX	$\mu_0 = 0.80$ $\mu_1 = 1.00$ $\mu_0 = 2.75$ $\mu_1 = 2.44$ $\mu_0 = 4.47$ $\mu_1 = 3.34$ $N_0 = 109$	$R_0 = 60.9$ $R_1 = 73.5$ $R_0 = 64.1$ $R_1 = 50.8$ $R_0 = 65.7$ $R_1 = 39.2$	$t = 5.22^{***}$ $Z = 1.91^{**}$ $t = 1.70^*$ $Z = 1.33$ $t = 2.46^{**}$ $Z = -2.67^{***}$ $N_1 = 15$	$\mu_0 = 0.55$ $\mu_1 = 0.88$ $\mu_0 = 5.95$ $\mu_1 = 5.76$ $\mu_0 = 4.52$ $\mu_1 = 4.43$ $N_0 = 86$	$R_0 = 49.15$ $R_1 = 66.4$ $R_0 = 53.4$ $R_1 = 44.5$ $R_0 = 51.7$ $R_1 = 53.4$	$t = 3.46^{***}$ $Z = -2.57^{***}$ $t = 1.04$ $Z = -1.12$ $t = 0.15$ $Z = 0.22$ $N_1 = 17$	$\mu_0 = 0.82$ $\mu_1 = 0.91$ $\mu_0 = 5.89$ $\mu_1 = 5.76$ $\mu_0 = 1.71$ $\mu_1 = 1.62$ $N_0 = 75$	$R_0 = 47.0$ $R_1 = 51.1$ $R_0 = 49.7$ $R_1 = 42.1$ $R_0 = 49.3$ $R_1 = 43.6$ $N_1 = 22$	$t = -0.97$ $Z = -0.97$ $t = 0.81$ $Z = -1.13$ $t = 0.52$ $Z = -0.84$ $N_1 = 22$	$\mu_0 = 0.88$ $\mu_1 = 0.87$ $\mu_0 = 5.99$ $\mu_1 = 5.73$ $\mu_0 = 9.78$ $\mu_1 = 9.14$ $N_0 = 73$	$R_0 = 52.1$ $R_1 = 51.6$ $R_0 = 56.2$ $R_1 = 41.6$ $R_0 = 51.8$ $R_1 = 52.4$ $N_1 = 30$	$t = 0.13$ $Z = -0.13$ $t = 1.92^{**}$ $Z = 2.25^{**}$ $t = 0.48$ $Z = -0.10$

***, **, *, statistically significant at the 10%, 5% and 1% levels, respectively. The t values and Z values are those resulting from the test (i.e., respectively, the Student t test and Mann-Whitney U test) of the hypothesis to ensure that there is no difference upon the financial statements valuation principles resulting from a change in the independent variable. Subscript 1 denotes firms using upward asset revaluation, and subscript 0 denotes firms using historical costs entirely for the reporting of their financial statements. LEV is the total financial debts-to-total-assets ratio. SIZE and OD are, respectively, the logarithm of total sales and 1 minus the percentage of voting rights of the main, known shareholders. IOS is the market-to-book ratio. EXPORT is the ratio of foreign sales to total sales. SWX takes the value zero for cross-listing status and one otherwise. INTEREST is the total Interest expenses of a year, average financial debt of the same year, and R denote, respectively, the mean and the rank of each sub-sample.

Table 6
Logit regression results

Variable (expected sign)	2004	2000	1997	1994
LEV	0.946 (0.16)	-0.12 (0.004)	5.91 (5.15)**	5.61 (5.65)***
OD	-1.90 (1.82)	2.03 (2.25)	-0.50 (0.18)	0.43 (0.16)
EXPORT	3.38 (6.58)***	3.23 (8.68)***	1.99 (3.28)*	3.28 (9.05)***
IOS	-1.14 (1.50)	1.18 (2.12)	15.54 (4.82)**	0.65 (1.96)
				0.65 (7.29)***
Constant	16.86 (0.00)	1.51 (1.52)	2.67 (4.97)**	4.16 (10.48)***
χ^2 of the model	26.82***	18.75***	23.84***	23.11***
α , correctly classified	85.7%	86.6%	85.4%	77.9%
Nagelkerke	78.7%	28.3%	34.9%	32.7%
Pseudo R^2	39.1%	42.8%	38.2%	39.0%
Observations	N=124	N=103	N=97	N=103

*, **, ***, statistically significant at the 10%, 5%, and 1% levels, respectively. Wald statistic in parentheses. The independent variable } 0 when financial statements are based on historical costs exclusively, and }=1 otherwise (i.e., with upward asset revaluation). IFV is the total financial debts to total assets ratio. OD is 1 minus the percentage of voting rights of the main known shareholders. EXPORT is the ratio of foreign sales to total sales. SIZE is the logarithm of total sales and IOS is the market-to-book ratio. SWX takes the value zero for foreign exchange listing, and one otherwise. INTEREST is the total interest expenses of a year / average financial debt of the same year.

associated with the historical cost principle, as is expected according to H2, although the association is not significant for any of the years. Interesting results also appears in the year 2004, i.e., after the implementation of the new IAS 16 and IAS 40 which reduces the scope of the upward revaluation policy (via capital equity). Indeed, one may first note that the interest rate is not significantly different between the two groups from 1994 to 2000. That is, firms with more leverage exhibit similar interest rates to companies with less leverage. This would confirm the debt-costs hypothesis. Second, over the 11 years of the study, leverage declined and by 2004 the levels between the two groups were quite similar (i.e. 22.5% and 23.5%, respectively). Yet, with similar leverage ratios (without revaluation), firms that revalue their fixed assets upward exhibit a lower interest rate (INTEREST) than when using historical cost (the coefficient is significant at the 1% level with univariate tests).

The impact of export sales is puzzling. In 2004, contrary to prior years, upward revaluers had less export sales than non-revaluers. Thus, firms with more domestic activities (compared to the non-revaluers) have more incentive to revalue upward. The unbalanced samples may explain the differences. Although the motives for decreasing debt costs (or for increasing borrowing capacity) remain valid, the type of the companies that revalue has changed.

6. Conclusion

This paper investigates the economic factors likely to affect asset revaluation of the main Swiss listed companies. The Swiss environment provides interesting institutional characteristics because, in contrast to countries such as the United Kingdom and Australia (Cotter, 1999), firms rely heavily on bank loans for their external financing. It also allows the examination of the impact of international stakeholders' information needs on accounting-policy choices. Indeed, numerous Swiss companies rely on foreign sales or foreign investors to support their activities. This study contributes to the existing literature by shedding light on the motives for upwardly revaluing a firm's assets over a period where accounting standards relative to revaluation policy have changed. It also provides an opportunity to seek some international regularity in the rationale underlying such an accounting practice.

Results from the pooled-data regression suggest that firms using upward asset revaluation are more leveraged and have fewer investment opportunities than firms using only historical costs. It appears that upward revaluation is used as a method of signaling the firm's additional borrowing capacity and to increase its credit rating, as well as to reduce its likelihood of violating restrictive covenants. The empirical analysis also confirms prior studies relative to managers' concerns about international exposure (as such) in their accounting-procedure choices (Cullinan, 1999; Dumontier & Raffournier, 1998; Murphy, 1999; Raffournier, 1995). In a Swiss context, foreign sales are associated with the use of upward asset revaluation. Such a policy tends to decrease reported profits and leverage ratios. Assuming that managers aim to enhance the financial situation of their firm as perceived by foreign stakeholders, it seems that the financial situation is signaled via creditworthiness variables rather than profitability variables. The cross-sectional analysis confirms the results from the pooled regression and emphasizes the debt-costs hypothesis (although leverage has declined over the periods investigated) as interest rates have become lower for firms that revalue their fixed assets upward (compared to non-revaluers). Yet, two

caveats must be considered. First, it is difficult to exclude any potential, endogenous problem between variables. Second, revaluation motives should also consider fiscal impact in jurisdictions where tax accounting relies partly on group accounts: that is, where the unrealized gains from revaluations are taxed. Notwithstanding those caveats, overall it is reasonable to consider that, based on this study's results, the decision to implement revaluation seems to be guided mainly by the need to signal the firm's financial health, especially its additional borrowing capacity, and to a lesser degree sufficient profitability for its level of risk (i.e., the IOS).

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Discussion

A discussion on “Motives for fixed-asset revaluation: An empirical analysis with Swiss data”

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1. Introduction

In this paper Franck Missonier-Piera examines the economic motives of fixed-asset revaluations for companies listed on the Swiss stock exchange. He finds that foreign sales, leverage, and investment opportunities are associated with revaluations and concludes that revaluations are a vehicle towards improving the perceptions of international stakeholders and borrowers about the firm's financial health.

The general theme of this paper is one of clear relevance in accounting research and its examination is worthwhile: that is, what factors explain the variation in accounting choice across firms? Identifying factors that are correlated with different accounting practices is a basic stream of research in accounting that illuminates the importance of accounting choices in shaping a firm's economic reality. In the text that follows, the reader should keep in mind that as a discussant I necessarily focused on areas of concern and further improvement. Notwithstanding such comments, my overall disposition towards this paper is positive.

2. Contribution of the paper

It is typical in any study revisiting an old research question in a new country setting to ask: what can we learn from this study that we did not previously know from other settings? In this case, I believe the author has exploited the Swiss setting to justify the reason revaluations are worth studying here separately, in addition to the work carried out in other countries. Switzerland is, for the most part, a bank-based economy, and it is not *a priori*

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clear that accounting choice in Swiss firms would follow the same path as in Anglo-Saxon firms. Two of the research hypotheses posited here are closely related to the Swiss setting: access to debt financing, and the role of international stakeholders. Although variable-measurement issues and data limitations, detailed below, somewhat compromise the paper's message, one interesting underlying implication of this paper is that there are previously underemphasized context-specific factors that help to explain the variation in accounting practices across firms in Continental European countries.

3. Research hypotheses and related results

I found hypotheses one and three to be intriguing. What they really suggest, without explicitly stating it, is that accounting-method choice is a vehicle towards conveying management's positive, private information about a firm's financial health. In an environment where an information asymmetry gap exists between management and the firm's other constituents (traditionally thought of as shareholders, but in this case creditors and customers as well), accounting practice can help bridge that gap. That is, management self-selects into revaluing its fixed assets, with the external guarantee of its auditor, thereby conveying a costly-to-replicate signal about its creditworthiness and overall financial health to creditors and international customers. Although not formally framed as such, this is effectively a signaling hypothesis, an aspect of the paper that I found very intuitive.

The second hypothesis indirectly suggests that managerial incentives help to explain earnings-management motives by managers. The empirical prediction is that ownership structure is related to revaluation policy. I believe managerial incentives are an important determinant of accounting practices. There are, however, a few issues of concern with the conceptual development and empirical approach adopted here: the incentive effects of ownership are likely to be nonlinear, positive for the lower-ownership range, and negative, due to a dominating entrenchment effect, thereafter. This nonlinearity is not conceptually discussed, nor empirically accounted for, in the model. Related to that, the variation in ownership structure across the sample firms is very low. From Table 1, 75% of firms have insider ownership of more than 29.1%. The great majority of sample firms are owner-controlled, rendering the study of differences in accounting choice across ownership structures difficult. Also, the study does not separate between managers and other external blockholders, aggregating their ownership interests into a single measure. The two groups may have quite different reporting incentives.

The fourth hypothesis makes mixed predictions according to the author: high-growth firms may have a greater need to revalue, to convey information to shareholders about the firm or, alternatively, they may be less likely to revalue simply because they have fewer assets in place, a mechanical association. My view on this is that measuring growth opportunities using market-to-book ratios by definition identifies high-growth firms: that is, firms whose assets are already highly valued by the market and which have higher market values relative to book values. Therefore, firms would have a greater need to revalue their assets to send a signal to shareholders if those firms are not appreciated by the market, as signified by their *lower* market-to-book ratios. Both this alternative scenario, which is also another version of an information-signaling hypothesis, and the mechanical explanation posited by the author, point to a higher incidence of revaluations among firms with lower market-to-book ratios. The empirical evidence is strongly consistent with this line of thinking.

4. Sampling and methods

A broad cross-section of firms is sampled in each of four years from 1994 to 2004. The author has done his best to include all Swiss firms with available data in the model. Even so, the sample for any one year is fairly small, limiting the degrees of freedom and the test power, thereby limiting confidence in the significance of the coefficients. Further, firms are classified as revaluing and nonrevaluing and then compared across several hypothesized dimensions. A notable limitation of this approach is that, in any given year, we cannot definitively conclude whether a significant association uncovers an antecedent or a consequence of revaluation because we do not know the exact year the revaluation policy was first adopted by a firm. For example, given a positive association between leverage and the incidence of revaluation, does a firm revalue its assets because it is highly leveraged, or was it able to borrow more as a result of revaluation? Thus, we can only speak of associations, not causality.

Further, omitted correlated variables may affect the results to the extent firms self-select into the two categories on the basis of factors that are not adequately controlled for in the model. The two samples are not matched, as is customary, although the models control for industry and size considerations. Identifying the first year a revaluation policy was adopted, and matching adopters to nonadopters would abstract from these problems, albeit at the expense of sample size.

Also, by pooling firms across years in a single model, independence is likely to be violated because firm characteristics are likely to exhibit high temporal correlation within each firm. A panel-data technique that would in theory control for this problem would be the inclusion of firm fixed effects in the model, or the focus on variable changes, rather than variable levels. Nevertheless, the relative “stickiness” in the variables of interest from period to period reduces the signal-to-noise ratio, and the possibility any significant effects will be discerned with such an approach.

Data limitations keep the author from further refining measurement of the hypothesized effects. For example, if revaluations are motivated by access to capital, it is reasonable to expect that banks have proprietary access to information that the investing public does not have. Public debt holders are in a greater need for information through financial statements. Thus, it may be that the relative magnitude of public, rather than bank, debt is most important in the results. A related breakdown of the leverage variable could be informative. Further, in addition to international customers, international stakeholders comprise foreign shareholders of the firm, foreign employees, and foreign suppliers. Collecting such information and comparing it across revaluing firms and all others would enrich the empirical analysis. The stakeholder dimension of this paper comprises a distinct contribution and building up the empirical rigor supporting it would better illuminate its role in this accounting choice.

5. Conclusions

One policy implication of the results not discussed in the paper is the following: broadly, this paper documents that a certain accounting choice (the decision to revalue the firm's fixed assets) is not random, but rather it is systematically related to firm-specific characteristics. In equilibrium, this may be interpreted as evidence that a firm optimizes on the amount and type of information it provides to external users of financial statements by

weighing related costs and benefits. Firms with different needs (for financing and customer base, for example), select different accounting alternatives. This, in turn, suggests that if policy makers take away flexibility by mandating uniform accounting rules across firms they may create unnecessary costs and redundancy in information disclosure, while limiting the ability of firms to signal information to the public.

6. Possible extensions

There are some interesting possible extensions to this study that would complement the current results. A study focusing on long-term changes in firm characteristics following asset revaluation would provide more definitive evidence about the true consequences of the revaluation decision. For example, if revaluation is motivated by access to capital considerations, are there any changes in the revaluing firm's leverage, its ratio of public to private debt, and its cost of capital following the revaluation year, either raw or relative to an industry or control-firm benchmark? Also, if revaluation is an attempt to appeal to international stakeholders, is there a change in the firm's fraction of foreign sales, importance of foreign suppliers, and the fraction or cumulative ownership of foreign shareholders following revaluation? Of course, such tests presuppose that the year a revaluation was first adopted is identified.

Further, what are the stock market effects of revaluation? How does the market react to the announcement a firm will revalue its assets? Is the market response to this announcement related to the hypothesized effects? That is, do the stock-related benefits to shareholders depend on the firm's financing needs, agency problems, degree of stakeholder orientation, and growth opportunities?

More broadly, a separate study could use revaluations as a setting to examine the role of the firm's internal-governance mechanisms in determining accounting-method choice. Revaluations have a material effect on financial statements, carrying both potential benefits and risks to shareholders. Do the characteristics of the firm's board of directors, its audit committee, and the compensation incentives of its managers influence the likelihood the firm will revalue its assets? Can the market see through the managers' variant incentives, in the backdrop of the firm's internal governance, in adopting such an accounting choice?

In closing, I believe Franck Missonier-Piera has executed a timely and interesting study with policy implications. Despite its data limitations, this work manages to shed light on the revaluation decision in the Swiss bank-based economy. This work also points to a number of research questions that are worth studying by researchers in the future.

Reply

Reply to discussion of “Motives for fixed asset revaluation: An empirical analysis with Swiss data”

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1. Introduction

In his discussion, Nikos Vafeas (the discussant) makes general comments and raises two important issues relative to some of the hypotheses I test, and to the methodological approach I follow. I appreciate the detailed and constructive comments Vafeas provides, and I thank him for his contribution with the possible extensions he suggests. I hope this reply addresses his main concerns.

2. Research hypotheses and related results

The discussant points out two issues on two of my hypotheses, i.e., one related to ownership structure and the second relative to investment opportunities. I consider the issues are mainly caused by data limitation, as I explain below.

Hypothesis two: Association between ownership structure and revaluation policy

The discussant has concerns about the association between the ownership structure of the firm and its revaluation policy. He considers that “The incentive effects of ownership are likely to be nonlinear, positive for the lower-ownership range, and negative, due to a dominating entrenchment effect, thereafter”. The association I propose relies on the underlying assumption that ownership dispersion amplifies agency problems due to the separation of

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control and ownership. When ownership is diffused, managers have more latitude in selecting the relevant revaluation policy that maximizes their utility. Due to data limitation, I could not refine further my analysis and the corresponding empirical approach: i.e., if and when the interests of the managers are aligned with those of the shareholders. For example, as suggested by the discussant, when measuring ownership concentration, I could not isolate managers' ownership from other external block-holders. We may also consider another issue with my hypothesis. It assumes also that the remuneration committee will not adjust managers' compensation for accounting choices (Baber, Kang, & Kumar, 1998).

Yet, I do not think the lack of data availability should impede me proposing such a hypothesis. Indeed, managers have at least two incentives to select income-increasing revaluation policy (i.e., not to revalue upward): the presence of a bonus plan tied to earning figures and the will to report a flattering image of the firm. Both incentives are more likely to occur in diffused-ownership firms (i.e., to increase compensation and or to dissuade hostile takeovers, respectively).

Hypothesis four: Association between investment opportunities and revaluation policy

Hypothesis four makes mixed predictions and states that the importance of the firm's investment opportunities is associated with the use of upward fixed-asset revaluations. The discussant brings up an issue relative to the proxy I use for investment opportunities, i.e., the market-to-book ratio. He then proposes an alternative argument that is: "Firms would have a greater need to revalue their assets to send a signal to shareholders if those firms are not appreciated by the market, as signified by their *lower* market-to-book ratios". Prior studies have suggested a similar argument (Brown, Izan, & Loh, 1992; Easton, Eddey, & Trevor, 1993). Although I would agree with the discussant, it does not compromise the hypothesis of the paper *per se*, but its corresponding proxy. Besides, as mentioned in footnote 21, I also use Tobin's Q as another proxy (not affected by the revaluation policy), and obtain similar results.

The research design I use simply considers that there should be an association between the investment opportunities and revaluation (*ex post*). The hypothesis provided by the discussant is based on an *ex ante* market-to-book ratio, which is not the subject of the current paper. Due to data limitation (see next section), to test the discussant's assumption would require me to identify the year of the upward revaluation. This point has been emphasized by the discussant: "we cannot definitively conclude whether a significant association uncovers an antecedent or a consequence of revaluation because we do not know the exact year the revaluation policy was first adopted by a firm".

3. Sampling and methods

The discussant raises several concerns about the sampling and the methodology used in this paper. First, because of my cross-sectional design, we can only speak of associations, not causality, between the revaluation choice and independent variables. I concur with the discussant's observations on this point and would argue such is the case with most studies relying on a similar empirical approach. Second, the discussant is concerned about the absence of the use of a matched sample. I should emphasize that because very few Swiss

listed companies use upward revaluation (i.e., 30, 22, 17, and 15, respectively for the years 1994, 1997, 2000, and 2004), opting for a matched-sample approach would lower significantly the size of the sample and the robustness of the empirical analysis. Third, he mentions that “by pooling firms across years in a single model, independence is likely to be violated because firm characteristics are likely to exhibit high temporal correlation within each firm”. Although, this remark is relevant, it should be noted that I use unbalanced panel data. Thus, a quite low number of firms appear in the four periods included in the pooled-data sample (i.e., 1994, 1997, 2000, and 2004). This limits the relevancy of the use of a firm’s fixed-effect. Fourth, data limitation kept me from refining the test of the stakeholders’ hypothesis. Hence, Vafeas suggests including other stakeholders in the analysis—such as foreign shareholders of the firm, foreign employees, and foreign suppliers—instead of only foreign customers. Unfortunately, it was not possible to obtain information—for a sufficient number of firms—for these other international stakeholders.

4. Possible extensions

The last section of the discussion provided by the discussant proposes several interesting possible extensions, among them: “For example, if revaluation is motivated by access to capital considerations, are there any changes in the revaluing firm’s leverage, its ratio of public to private debt, and its cost of capital following the revaluation year, either raw or relative to an industry or control-firm benchmark?”. The question relative to the impact revaluation may have on the cost of capital is taken into consideration in the paper (partially only). Indeed, and again although it was not possible to identify the year of the upward revaluation, it is interesting to observe (from Table 5) a decrease in the leverage ratios (*average*) for both groups of firms (*revaluers* and *non-revaluers*) over the years, to a point where they reach similar levels. Interestingly, the *average* interest rates evolved in the opposite manner. That is, interest rates for both groups started at a similar level in 1994 and became lower in 2004 for *revaluers* compared to *non-revaluers*. This suggests that *revaluers* exhibit a lower cost of debt (i.e., measured at the *average* interest rate) when they have a similar leverage ratio, and a similar cost of debt when they have a higher leverage ratio.

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Book Review Section

The book review section is interested in works published in any language, as long as they are comparative or international in character. The author or publisher of such works should furnish the book review editor with two (2) copies of the work, including information about its price and the address where readers may write for copies. Reviews will be assigned by the book review editor. No unsolicited reviews will be accepted. Suggestions of works that might be reviewed are welcomed.

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Book review

Contemporary issues in financial reporting: A user-oriented approach, Paul Rosenfield, Routledge, Abigdon/New York (2006), xxiv + 561 pages, \$160, £90.00, ISBN 10: 0-415-70206-2 (hbk)

Paul Rosenfield has been on the “firing line” of the development of financial accounting reporting standards. A CPA, in the 1970s he served on the research staff of the AICPA’s Accounting Principles Board (APB) and was the first full-time secretary of the International Accounting Standards Committee. He drafted the APB’s *Statement on Basic Concepts and Accounting Principles Underlying Financial Statements of Business Enterprises* (1970), the forerunner of the FASB’s conceptual-framework project. Consequently, it is somewhat surprising that he is so critical of that framework – indeed, of both the current and proposed practice of financial reporting. Rosenfield contends that issuers of financial statement “have collectively skewed the standards to their benefit and to the detriment of the users and of society [p. xix].” In his opinion, “the issuers have turned financial reporting under GAAP into a Wonderland portrayal of the product of their imaginations ... rather than a neutral portrayal of the current financial condition and past financial progress the reporting entity has thus far achieved, and of current factors the users should consider in evaluating the reporting entity’s prospects for further financial achievement [p. xix].” As a result, he writes, “those developments prevent successful auditing of the amounts in financial statements prepared in conformity with current GAAP [p. xx].”

I found it quite difficult, though, to determine the specifics of his complaints, since a substantial portion (perhaps more than half) of his 512 page book (excluding references and index) quotes brief assertions by over 430 accounting authorities (most notably: Ray Chambers, Eugene Flegm, Vernon Kam, A.C. Littleton, Leonard Lorensen, W.A. Paton, Walter Schuetze, George Staubus, and Robert Sterling). In addition, Rosenfield offers short selections from AICPA, FASB, and other official statements, often as a prelude to equally brief and often disparaging comments. Although these are designed to give readers a sense of the variety of opinions that abound, few of the quotations do more than just state an opinion, conclusion, or pithy remark without supporting reasoning, example, or study. Essentially, the reader is given a series of written “sound bites.” Although these do provide readers with evidence that many topics are supported or criticized by many observers, it was difficult for me, at least, to discern just what Rosenfield, himself, is critical of and, of greater importance, his reasoning and evidence for that criticism. Nevertheless, I was able to glean the following from his book.

Rosenfield does not like the matching concept, which he says is but a vestige of venture reporting, where income and expense were and could be matched because the venture was dissolved. Although that system met the needs of investors in ventures, they are not the current users of accounting reports – investors and creditors of ongoing companies. Accounting statements should provide them with information from which they could appraise accountability and make economic decisions.

The problem, as Rosenfield sees it, is that issuers of financial statements do not want to inform users of those statements. Issuers want to manage income – to report income as high as possible and expenses as low as possible, and to smooth net income. Financial statements should be designed to prevent such manipulations. In his discussion of how this should be accomplished, Rosenfield goes through the usual list of desirable attributes – representativeness, relevance, neutrality, reliability, understandability, verifiability, timeliness, consistency, and comparability – discussing each briefly with copious quotations from various authorities.

But what is it about our current and proposed system of financial reporting to which Rosenfield objects? After 130 pages, his general objections are specified in Part II, entitled “Issues underlying financial reporting.” Rosenfield writes: “Violation of neutrality by stabilizing reported income by the design of GAAP for the benefit of the issuers is the single worst and most pervasive cause of deficiencies in current GAAP [p. 145].” The main way income is stabilized is by avoiding or dampening earnings volatility, presumably with historical-cost numbers and accrual accounting. From this critique (and from his belief that financial statements should serve users’ demands for information that informs economic decisions), it would seem that Rosenfield favors restating assets and liabilities at their present values. But he objects to these measurements, primarily because they require estimates of future cash flows. He asserts: “financial statements need to report what is and what happened, outside of thoughts of the issuers about the future [p. 37].” These “thoughts” include probabilities about future events, including the probability that employees will continue with the firm (which informs accounting for pensions and post-employment compensation) and that the issuer will continue as a going concern. He writes: “the continuance of the reporting entity shouldn’t be assumed in the preparation of financial statements ... [But, issuers and their outside auditors should determine if the entity] soon might be a stopping concern. [in which event]... the issuers might revise the financial statements to a basis assuming liquidation of the reporting entity, such as the statement of affairs [p. 180].” He later advocates reporting assets and liabilities only at their selling prices, the key attribute of a statement of affairs.

This section of the book ends with a chapter entitled “The elements of the reporting entity represented in financial statements.” Rosenfield again insists that although “[t]he entire matter of financial statements is economic resources [p. 202],” the numbers reported therein should “be based solely on reliable measurements of the financial effects of relevant events affecting economic resources” that do not involve expectations of future events (e.g., cash flows). Hence, financial statement numbers cannot include present values. He agrees with the FASB’s 1976 *Conceptual Framework* that emphasizes the asset and liability approach, which, he writes “contrasts with the so-called revenue and expense approach, which has in effect been discarded [p. 214].” But, he does not discuss the FASB’s current move towards restating assets (starting with financial assets) at their fair values, except in

his rejection of present value calculations. Rosenfield presents some suggestions for alternative procedures in the next section of his book.

Part III is entitled, "Broad issues in financial reporting." A substantial portion of this section is devoted to objections to recording assets at their acquisition costs, which then are amortized as expenses. Once more Rosenfield objects to depreciation, because it serves to smooth income. He then turns to inflation accounting which, he writes, was abandoned by the FASB because "[p]eople said they didn't know what to do with the information [p. 270]." Their confusion, he believes, resulted from their being given supplementary information that competed with the usual unadjusted financial statement information. His solution: "One set of financial statements should be presented ... [where the numbers] should be defined in terms of the consumer general purchasing power of the unit of money [p. 271]." He does not show how this might be done.

Following a chapter in which he elaborates on his objection to present value for measuring the current values of assets (and, presumably, liabilities), primarily because they require estimates of future events, Rosenfield considers using current buying prices. He writes: "once a reporting entity buys an asset, it's finished with the buying market for the asset. ... Current buying prices violate the number one user-oriented criterion, representativeness, because they purport to represent nothing about the assets held by the reporting entity [pp. 288-9]." He objects to enterprises reporting holding gains (as proposed in 1961 by Edwards and Bell), because these are "cost savings [that] are in no sense revenue [p. 292] (from Paton & Littleton, 1940, p. 64)" In effect, he rejects opportunity gains and costs because these are not part of history, and, hence, should not be a component of net income. Replacement costs are similarly rejected, since they refer to assets the entity doesn't own and hasn't sold. In short, Rosenfield concludes: "Gains and losses involving fictional conditions shouldn't be presented in income statements [p. 298]."

Rosenfield wants the accounting authorities to adopt "current selling price reporting (CSPR)," wherein assets and liabilities are stated continuously at their selling (exit) prices, with changes in those prices from previously recorded numbers reported as income or expense. If an asset has no severable value to an outside, independent potential buyer, it would be written down to positive or negative scrap value (net scrap value). Thus, if a company purchased a special-purpose machine that could not be sold, it would be written down immediately to its scrap value. Presumably, if the company would have to pay to have the machine removed, it would have a negative value and be stated as a liability. Rosenfield doesn't mention work in progress, but since semi-finished goods would rarely have a ready market, they also would be recorded at net scrap value.

Liabilities similarly would be reported at the amounts that a third party would require to assume the liabilities. This application of CSPR, though, seems to bother Rosenfield. He writes: "if prospective creditors decide that a reporting entity's debt instruments have become worthless, they will bid them down to near zero. The reporting entity's reported net income will skyrocket. There has to be something wrong with that [p. 343]." But, when an entity's prospects have improved such that it finds investing in a special-purpose machine or other fixed assets that are not regularly traded, its expenses will skyrocket downward when it makes these investments. There seems to be something wrong with that! Furthermore, since many assets and liabilities have no ready markets, accountants would have to estimate the prices. But, Rosenfield should object to such estimates as they present

the same problems as do estimates of entrance costs. Consequently, it appears that if the price cannot be readily and objectively determined from actual transactions, these assets and liabilities would be recorded at zero, which would additionally reduce net income, at least initially, and then as such assets and liabilities are acquired.

The fourth section of the book addresses "specific issues in financial reporting." Rosenfield applies CSPP somewhat consistently to these issues. He would have a corporation granting stock options record as an asset the services received in exchange for the options at an amount equal to the value of the stock options. But, he apparently forgets that the asset, employee services, would have no selling price and, hence, no value, and under his regime would immediately be expensed. He is consistent, though, in his discussion of deferred employee benefits: "imagined future vesting and imagined future salaries and wages should be ignored in reporting on pensions [p. 483]." Leases would be reported as assets only at the amount for which they could be sublet (presumably not present values), and the liability, therefore, would be reported at the amount required to have it taken over.

Stating assets and liabilities at the exit values does meet most of his list of desirable attributes, including relevance, assuming that users want to know the liquidation value of entities. Creditors might want exit or liquidation values, assuming that they could trust the numbers reported. Often these numbers must be estimated. For example, consider an inventory of finished goods that are discontinuously sold, such as special-purpose machines or houses. The exit values of these assets might be estimated with appraisals that could not readily be validated. Of greater importance, Rosenfield does not consider the extent to which financial statements prepared with exit values would be of value to investors. Since investors either are considering whether or not to buy or hold equity in a particular company, it would seem that they would want to know the economic value of assets and liabilities to that company (which is value in use), rather than the value of those assets and liabilities to others (which is exit value). Income statements would report as expenses the reductions in value of assets that have no resale value and the transaction costs of purchasing assets and liquidating liabilities. Considering the subtitle of the book – "a user-oriented approach" – Rosenfield should have analyzed how users might in fact use the statements he would have issuers produce. It seems clear, to me at least, that the system he proposes would be of very limited, if any, usefulness to investors in on-going companies.

Nevertheless, the FASB and perhaps the IASB have adopted the balance-sheet, fair-value model, where fair value is defined in terms of exit values. As stated in FASB Statement 157 (paragraph 5): "Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date." Thus far this definition of fair value has been applied only to financial assets and short-term liabilities. Its shortcomings are not as clear in this application, because there tend to be active markets for these assets and liabilities with proportionately small transaction costs. Hence, the entrance and exit prices usually are similar. But why should an approximation be sufficient when entrance prices are better measures of value for investors? Companies buy goods and services and assume liabilities because they expect them to transform them to increase stockholders wealth; the benefits from these transactions are expected to exceed their costs, including transaction costs. Entrance values, therefore, are clearly more meaningful to stockholders of going concerns than exit values. Furthermore,

once exit values are applied to other than financial assets and short-term financial liabilities, as discussed above, the resulting financial statements are of little or no value to equity investors. If exit values are not applied to anything but financial assets and short-term liabilities, both the balance sheet and income statement necessarily will be a curious mixture of exit and historical values.

Why, then, hasn't the FASB defined fair values in terms of entrance prices? One reason, I believe, is that many assets do not have entrance prices, since they would not be replaced in the same form. This is particularly true for productive assets, such as machinery and buildings. Indeed, the SEC's and FASB's required reporting of replacement values (ASR 190 and FAS 33) were rescinded following many complaints of both the cost and uselessness of the data. But, the current costs (replacement values) of financial assets and liabilities should be no more problematic than their exit values. Furthermore, the current values of purchased inventory, a major asset for many companies that the FASB and IASB have ignored in their quest for more relevant numbers, could readily be stated at their replacement costs. In fact, by the time financial statements are prepared, for many companies those inventories would have been replaced at known prices. Consequently, I am at a loss to understand why the accounting authorities opted to define fair values in terms of exit rather than entrance prices.

But, even entrance prices provide insufficient information for investors. It is value in use, not value in exchange, that investors buy when they purchase or hold a company's stock. Exit values are useful indicators of stockholders' wealth only when their companies' managers have paid more for the assets or assumed greater liabilities than they should have (ex post or ex ante) and the managers are too incompetent or dishonest to offload them.

But there are very good reasons why financial statements should not be based on values in use. These amounts are measured primarily as present values of expected cash flows. Such calculations require estimates of the cash flows, an exercise fraught with error, both inadvertent and deliberate, as is the appropriate discount rate. Joint and common activities make such calculations even more difficult, indeed conceptually impossible if the goal is to assign values to individual assets and liabilities. The most important disadvantage, though, is that present value and similar calculations allow over-optimistic, opportunistic, and dishonest managers to manipulate reported asset, liability, and net profit amounts.¹

It is a truism, though, that one can beat a model only with a better model. The FASB and IASB are moving towards the asset liability model, wherein the balance sheet is restated at fair values, and away from the traditional income/expense model wherein expenses are matched to reported revenue and for which the balance sheet serves essentially as a bridge between income statements rather than as a statement of economic values. Rosenfield does not consider these alternatives except to criticize aspects of traditional accounting. This is not the place for a rigorous or even adequate consideration of the asset liability model. Therefore, I refer readers to *Worldwide Financial Reporting: The Development and Future of Accounting Standards*, Oxford University Press, 2006, in which my co-authors (Michael Bromwich, Robert E. Litan, and Alfred Wagenhofer) and I consider the issues in some detail. We conclude that although the asset liability approach is attractive, it cannot be

¹For an example of such manipulations that, in my opinion, directly led to the failure of the Enron Corporation Benston and Hartgraves (2002), and Benston (2006).

implemented, substantially because a large portion of the required economic values cannot be determined objectively. Hence, financial statements based on them would be subject to the type of managerial manipulation to which Rosenfield correctly objects. Our overarching requirement is that the numbers reported in financial statements be trustworthy, that they are what they purport to be. All the other often enumerated desirable attributes—neutrality, reliability, understandability, verifiability, timeliness, consistency, comparability, and particularly relevance—are secondary if the numbers cannot be trusted. It should be recognized and accepted that financial statements cannot provide investors, creditors, and other users with all the information they need to make effective economic decisions. But, they can provide them with information they can trust, in large measure because they were audited and attested to by independent public accountants.

These numbers reported in financial statements have been and can be very useful to investors and other users. Historical costs are valuable for providing stockholders with information as to how the resources entrusted to managers were used and with assurance that gross misuse and dishonesty, at least, has been tested for and, if found, was reported to the board of directors through the audit committee and to stockholders. The traditional income expense matching model provides investors with information that has been found to be very useful for estimating future prospects as well as past performance. The model, though, can readily be modified to include current values when these can be objectively determined (including the replacement values of inventories that would be replaced), with holding gains and losses reported as part of current net income. Where comparisons are made with past periods, the numbers can be transformed to the current purchasing power of the unit of exchange, much as international firms translate the statements of foreign subsidiaries into the home country's currency. Subject to these basic "principles," there would be less need for the increasingly large body of rules that the accounting authorities, particularly the FASB, have been generating.

Returning, now to Rosenfield's book, it should be clear that I found much with which to disagree. Many readers, though, might find it worth reading and considering. Rosenfield presents a remarkable array of quotations from and references to important thinkers about current accounting issues. His views reflect, to a substantial degree, the thinking of FASB and IASB policy makers. Consequently, both practitioners and academics might find the book useful for understanding the standard setters' drive towards fair-value accounting.

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reduced her epileptic seizures**

**performed by a neurosurgeon who was
able to pinpoint the foci of the seizure**

**due to breakthroughs in the
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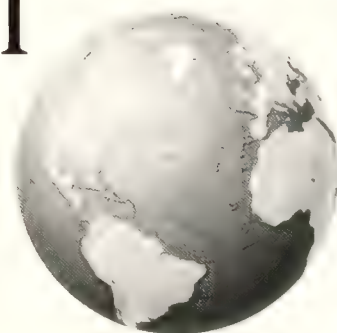
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Accounting-based regulation in emerging markets: The case of China's seasoned-equity offerings

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Abstract

In China, listed companies are required to achieve a minimum return on equity (ROE) before they can apply for permission to issue additional shares through seasoned-equity offerings (SEO). We document two benefits of this accounting-based regulation in China. First, this regulation limits the increase in the supply of shares and the dilution of existing share prices. The Chinese stock market reacted positively to the announcement of this accounting-based regulation. Moreover, investors' reactions to SEO announcements are less negative since the accounting-based regulation was introduced than before the regulation was enacted. The second benefit is that the regulation reduces adverse selection in SEO, as shown by the finding that prior to this regulation, firms below the ROE threshold underperformed the market after their SEO, much like what has been observed in other markets; while those above the threshold outperformed the market. Thus, although positive accounting theory predicts that regulations based on accounting numbers create incentives for managers to manipulate their accounting numbers, accounting-based regulations in China seem to serve some useful purposes.

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Keywords: Accounting-based regulation; Seasoned-equity offering; China

1. Introduction

Contracts and regulations based on accounting numbers could provide the incentive for contracting parties to opportunistically manipulate accounting data (see a review in Healy

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& Wahlen, 1999) because it is costly for enforcers to “undo” such earnings management (Watts & Zimmerman, 1990). Thus, in a mature market, regulations seldom are based on accounting numbers. However, in China, regulators have long required listed companies to achieve a minimum return on equity (ROE) before allowing them to apply for permission to issue additional shares through rights issues. Moreover, after allowing companies to conduct seasoned equity offerings (SEO) in 2000, the Chinese government found it necessary in July 2002 to impose a minimum ROE of 10% as a qualification for firms to initiate SEO (referred to as the “2002 Regulation” hereafter).¹ Although previous studies show that the accounting-based regulations in China have led to opportunistic earnings management and capital misallocation (Chen & Yuan, 2004), Chinese regulators still maintain the ROE threshold requirement in determining the qualification of rights issues and SEO.

The public-interest theory of regulation, or the “helping hand” view that originated from Pigou (1938), characterizes the regulation process as one in which government intervention corrects market failures and maximizes social welfare (Joskow & Noll, 1981). In the case of regulating equity issuance after initial public offerings (IPO), regulators in many countries typically adopt a “disclosure-based approach.” That is, no official approval is needed for the issuance of additional shares as long as companies provide adequate disclosure. For example, a company must file an application to and seek authorization from the New York Stock Exchange prior to the issuance of additional shares. There is no profitability threshold that the company has to meet before making the application.

The situation in China differs in at least three aspects. First, when the market is moving up, investors tend to gobble up most of rights issues or SEO due to a lack of market efficiency. As time goes by, investors might learn to weed out firms that have poor prospects. However, at the current stage of China’s market development, investors do not have this level of sophistication. At least, the government does not believe so. The second difference is that firms can sell additional shares at a discount from the ongoing price. This is typical in other markets. For example, Corwin (2003) reports that in the United States, the SEO discount (the discount of offer price from the market price before the SEO announcement) averaged 2.92% in the 1990s. In China, the average discount is much higher: 21.6% based on 119 SEO from June 1998 to June 2005. This high discount in effect forces current holders of tradable shares to buy the additional shares to avoid the dilution of the value of their shareholdings. The majority shareholders, who typically own nontradable shares (Chen & Xiong, 2002), do not suffer from the dilution. The third difference is that research in many equity markets worldwide has documented an “adverse-selection problem” in equity offerings. That is, managers know more than the market about the true value of the firm and have incentives to issue SEO when the prices of their stocks are overvalued (Myers & Majluf, 1984). As a result, investors typically react negatively to SEO announcements (e.g., Iekbo & Masulis, 1992) and the stocks of SEO firms significantly underperform the market after the offering (e.g., Loughran & Ritter, 1997, December). This problem is more severe in China, again because most of the majority shareholders’ shares are not tradable and they do not suffer from negative market reactions or from poor post-

¹ Firm can issue additional shares through rights issues, in which shares are sold to existing shareholders, or SEO, in which shares are sold to the public.

SEO stock performance. Thus, Chinese regulators considered the use of a mechanical hurdle to limit the number of firms that can undertake SEO.

We postulate that China's 2002 accounting-based regulation of SEO serves two purposes. First, by restricting SEO opportunities to firms meeting the 10% ROE threshold, the regulation limits the potential supply of additional shares to the market. Second, the ROE threshold precludes firms with relatively poor operating performance from issuing additional shares. Since their stock prices are more likely to underperform in the future, the regulation can reduce the adverse-selection problem. In this study, we use 250 firms announcing SEO proposals around the timing of the 2002 Regulation (187 firms before the regulation and 63 firms after) to document several pieces of empirical evidence that are consistent with these two benefits. We find that the Chinese stock market reacted positively to the announcement of the accounting-based regulation. Moreover, for firms with ROE above the threshold, the market's reaction to the SEO proposal announcement was less negative after the accounting-based regulation than before the regulation. We also find that firms below the ROE threshold underperformed the market after their SEO, much like what has been observed in other markets, while those above the threshold outperformed the market. That is, the accounting regulation was able to reduce the adverse-selection problem whereby firms conduct SEO when their stocks are overvalued. Thus, although positive accounting theory predicts that regulations based on accounting numbers create incentives for managers to manipulate their companies' accounting numbers, the accounting-based regulation in emerging markets such as China's seems to serve some useful purposes.

Table 1
China's regulation of rights offerings and SEOs

Date	Regulation of rights offering	Regulation of SEO
Nov. 17, 1993	Listed companies were allowed to issue rights to existing shareholders if they are profitable in the previous two years.	SEO was not allowed
Sept. 30, 1994	Three years' profits and three-year average return on equity (ROE) $\geq 10\%$	
Jan. 24, 1996	ROE $\geq 10\%$ in each of previous three years.	
Mar. 17, 1999	Three-year average ROE $\geq 10\%$ and ROE $\geq 6\%$ in each of previous three years	
May 22, 2000		<i>The 2000 Regulation:</i> companies with three years' profits can apply to the CSRC for conducting SEO. ^a
Mar. 15, 2001	Three-year average ROE $\geq 6\%$.	<i>The 2001 Regulation:</i> three-year average ROE $\geq 6\%$ but not definitive. Companies not meeting the threshold can be qualified provided that the management and the underwriter provide detailed explanation that shows the healthy condition of the company.
July 24, 2002		<i>The 2002 Regulation:</i> Three-year average ROE $\geq 10\%$ and ROE $\geq 10\%$ in the previous year.

^a The regulation was released by the CSRC on May 22 and published in newspapers on the next day.

^b The regulation was released by the CSRC to all listed companies on Mar 15 and published in newspapers on Mar 28.

^c The exposure draft was released on June 22 and the final regulation was released by the CSRC on July 24. It was published in newspapers in July 26.

The rest of the paper is organized as follows. Section 2 briefly introduces the Chinese government's regulations on additional share issuance and some testable predictions. Section 3 discusses the sample and the empirical results. Finally, Section 4 offers concluding remarks.

2. China's regulations on issuing additional shares and possible benefits

2.1 Background of China's regulations on issuing additional shares

China's Securities Regulatory Commission (CSRC) has been using a merit-based system to regulate share issuance by listed companies. In the early 1990s, listed companies were able to issue additional shares only through preemptive rights offered to their existing shareholders. This kind of offering is known as a *rights offering* in the United States. Due to the lack of other means for listed companies to raise capital and the Chinese investing public's insatiable demand for stocks in the early 1990s, rights offerings were excessively abused by listed companies (Chen & Yuan, 2004). To curb this excessive activity, the CSRC issued a series of regulations to restrict rights issues after November 1993. As summarized in Table 1, each regulation required a minimum level of profit or ROE. The restrictions were tightened gradually: the 1993 regulation required only 2 years of profits; this was tightened to a three-year average ROE of 10% in 1994.² However, the 1994 regulation proved to be ineffective because the amount of capital raised through rights issues exceeded that from initial public offerings (IPOs) in 1995. As a response, the regulation in 1996 required an ROE of at least 10% in *each* of the previous three years. However, the 1996 regulation also created a remarkably clear pattern of opportunistic earnings management. Fig. 1 shows that there was a sharp increase in reported ROE between 10 and 11% for 1995–1998; this pattern was not found for 1992–1994, however, when there was no ROE requirement. In early 1999, in response to public criticisms of the earnings-manipulation phenomenon, the CSRC reduced the ROE requirement from 10 to 6% for each of the previous three years. However, the reduction of the ROE threshold did not seem to reduce the magnitude of earnings manipulation. Fig. 1 also shows that the spike in the distribution of reported ROEs moved to 6–7% for 1999–2004. In other words, the earnings manipulation target shifted from 10% to 6% as the regulation on rights issues changed.

To give companies more options to raise additional capital, the CSRC started to allow large-scale seasonal equity offerings (SEO) in May 2000 by issuing a regulation (*the 2000 Regulation* hereafter).³ This regulation did not impose a strict profitability threshold and any company with profits in the previous three years could apply to the CSRC for SEO authorization. Since the regulation on rights issues was much tighter at that time (i.e., a minimum three-year average ROE of 10%), a large number of firms rushed to announce SEO proposals. The CSRC then modified the regulations on both rights issues and SEO to

² Ten percent was roughly the rate paid on one-year bank deposit in China in 1994. The idea is that firms should return more than the bank deposit rate to deserve additional share issuance. Because bank deposit rates declined later, the threshold was reduced to 6% in March 1999, again roughly the prevailing bank-deposit rate.

³ See Table 1 for a series of regulations on SEO since 2000.

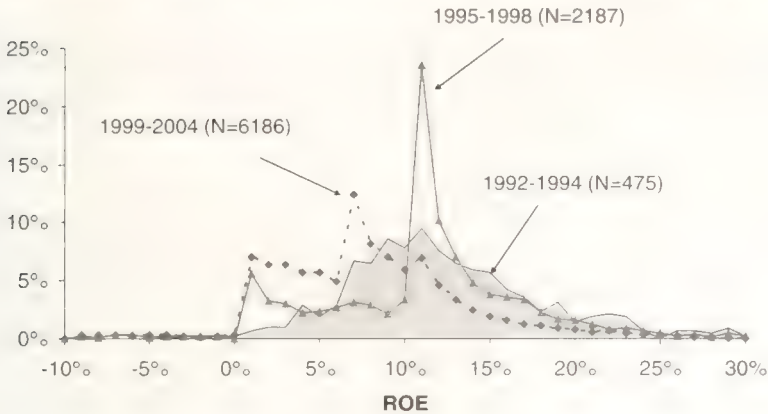


Fig. 1. The distribution of ROEs. This figure plots the distribution of the reported ROEs of all Chinese listed companies in three different periods from 1994 to 2004. ROE is net income divided by total shareholders' equity.

impose a consistent threshold (a minimal three-year average ROE of 6%) in March 2001 (*the 2001 Regulation* hereafter). However, the 6%-ROE criterion is not definitive: any company that did not meet the 6%-threshold could qualify if the management and the underwriter provided a detailed explanation that showed the healthy condition of the company.⁴ Thus, the 6%-criterion was almost equivalent to no profitability requirement at all. Many firms continued to announce SEO proposals. As tabulated in Table 2, there were 187 firms making such announcements in the span of about two years (from May 2000 to July 2002). Among them, 90 (48%) did not meet the 10%-ROE requirement.⁵ In July 2002, after calls by the media for stricter regulations (e.g., Liu, 2002), the CSRC required a minimal three-year average ROE of 10% for an SEO (*the 2002 Regulation* hereafter). This regulation was successful in substantially reducing the number of firms announcing SEO proposals. As shown in Table 2, there were only 63 proposals announced in the two and a half years from July 2002 to December 2004, and only seven firms did not meet the 10% ROE threshold. The seven firms were eligible according to a separate regulation issued in 2001 that allowed firms that were re-organized due to mergers, acquisitions, and major restructuring to issue additional shares with a minimum ROE of 6%. This change in the regulatory regime provides a unique setting for us to investigate the possible benefits of accounting-based regulations.

⁴ For example, Wuhan Department Store Group Co. Ltd. announced an SEO proposal right after the *2001 Regulation* went into effect. Its ROEs in the previous three years (1998 to 2000) were 3.16%, 2.72%, and 2.41%, all below 6%. A report by *NetEase.com* criticized the proposal and warned investors to invest with caution.

⁵ Table 2 also shows that, among the 97 SEO announcements made before July 2002 by firms with ROE above 10%, 48 (51%) completed their SEOs. By comparison, among the 90 firms that announced SEO in the same period whose ROE was below 10%, only 17 (19%) completed their SEO. The remaining 81% of firms were either rejected by regulators or approved but then abandoned the SEO plans voluntarily due to lower share prices. The high percentage of possible rejection by firms with ROE below 10% indicates that Chinese regulators might have used the 10% hurdle as an implied criterion in the approval process.

Table 2

The timing and ROE distribution of firms announcing SFOs before and after the July 2002 Regulation

SEO proposals made	Before 2002 Regulation (May 2000 to July 2002)	After 2002 Regulation (August 2002 to December 2004)	Total
By firms whose ROE $\geq 10\%$	97 (48)	56 (18)	153 (66)
By firms whose ROE $< 10\%$	90 (17)	7 (1)	97 (18)
Total	187 (65)	63 (19)	250 (84)

The table reports the number of firms announcing SEOs before and after the July 2002 Regulation and the completion status (the number of firms that completed SFOs reported in parentheses). The numbers are broken down into firms whose ROE was above or below 10% in the year before the SEO announcement.

2.2. Possible costs and benefits of China's regulations on issuing additional shares

The various regulations on SEO mentioned above imposed at least two types of costs for China's securities market. The first was the possible earnings management to achieve the numerical accounting threshold. Chen and Yuan (2004) show that a similar accounting threshold (i.e., an ROE of 10%) for rights issues set forth in 1996–1998 induced a clear earnings-management pattern, in which firms used non-operating items to achieve the rights-issue qualification. They document that many of those firms were able to obtain the governmental approval to conduct rights issues, but their subsequent performance was generally below the industry norms. The second cost of a numerical threshold for SEO was that it would exclude firms with good future performance ("type I error") and allow firms with poor future performance ("type II error") to conduct SEO. For example, among all firms with ROEs less than 10% in 2002, only 13.4% had a turnaround in 2003 (with ROE above 10%). On the other hand, among all firms with ROEs above 10% in 2002, 35.5% had their ROEs fall below 10% in 2003. Thus, using 10% as a benchmark for performance, the numeral rule creates both types of error.

Despite the costs of the numerical rules, the Chinese government until now still uses similar rules to establish rights issue and SEO qualifications. As we mentioned in Section 1, there are two possible benefits of this accounting-based regulation: one is that the regulation limits the potential supply of additional shares to the market and the other is that the regulation can reduce the adverse selection problem in equity offerings. We make three testable predictions from these two benefits. First, as mentioned in the previous subsection, when there was essentially no profitability threshold requirement before 2002, a great number of firms rushed to propose SEO. The profitability threshold set forth in *Regulation 2002* substantially reduced the number of firms that could issue SEO. In China, the supply of shares is tightly controlled by the government, whose approval is needed before a listed firm can issue additional shares. Since the overall stock-price level is determined by the supply and demand of shares, any regulation to restrict the supply of shares, such as the *2002 Regulation*, is likely to be considered by the stock market as good news. That is, we expect to find a positive market reaction to the announcement of the *2002 Regulation*. As a comparison, the *2001 Regulation* did not require a clear-cut profitability threshold, thus the market reaction to the announcement of that regulation should be much weaker. In addition, the *2002 Regulation* should affect firms that did not meet the 10% cut-off more

positively because it disqualified those firms from issuing new shares and hence reduced their adverse-selection problems. Thus, we predict that the market reaction to the announcement of the *2002 Regulation* is stronger for firms whose ROE are below 10% than for firms whose ROE are above 10%.

The second prediction is that investors might react less negatively to individual firms' SEO announcements after the *2002 Regulation*. In other markets worldwide, investors typically react negatively to SEO announcements. One of the reasons is the "adverse-selection problem," i.e., managers know more than the market about the true value of the firm and have incentives to conduct SEO when the prices of their stocks are overvalued (Myers & Majluf, 1984). Thus, an SEO announcement is interpreted as overvaluation of the firm's stock in established markets (Eckbo & Masulis, 1995). We expect that the Chinese stock market would also react negatively to SEO announcements. In addition, when no accounting-profit threshold existed prior to July 2002, every company with a "healthy financial condition" could apply to the CSRC for SEO authorization. Firms had to compete with many others for SEO capital. Since the *2002 Regulation* severely reduced the number of firms that qualified to conduct SEO, qualified firms no longer needed to compete with many others for SEO capital. Thus, we predict that investors reacted less negatively to SEO proposal announcements after the *2002 Regulation*.

The third prediction about the *2002 Regulation* is that it reduced the adverse-selection problem in SEOs. The adverse-selection problem arises because firms time the market in issuing additional shares when their market values are high, relative to book value and past market value (Baker & Wurgler, 2002, February). Thus, Loughran and Ritter (1995, March, 1997, December) find that firms conducting SEOs substantially outperform their non-issuing peers in both stock returns and accounting profitability prior to the SEO, but they significantly underperform their peers after the offerings. Under the *2002 Regulation*, firms were required to have an average three-year ROE of 10% in order to propose an SEO. Due to their superior performance, such firms are less likely to underperform their non-issuing peers after the SEO. Thus, we predict that the *2002 Regulation* reduced this adverse-selection problem. Empirically, we expect that, among the 65 firms that completed SEO before the *2002 Regulation*, the firms meeting the 10% ROE threshold should outperform the market after the offerings, while those that fall below the threshold should underperform the market.

3. Empirical results

3.1. Market-level reaction to the *2002 Regulation*

To test the market reactions to the two regulations in 2001 and 2002, we employ an augmented market model used in previous studies (see, e.g., Berger, Li, & Wong, 2005; Berkman, Cole, & Fu, 2005). More specifically, we form a value-weighted portfolio of all 1126 listed firms with available data and analyze the cumulative abnormal returns around the announcement dates of the *2001* and *2002 Regulations*. We examine the market reactions to the regulations within a three-day window, starting from one trading day before to one trading day after the CSRC release of the new regulation (or the draft of the new

regulation, the exact dates for each regulation announcement are provided in Table 1).⁶ We estimate the cumulative mean-adjusted returns around each regulation announcement using the following ordinary least square (OLS) model:

$$R_t = \beta_0 + \beta_1 * \text{REG}_{2001} + \beta_2 * \text{REG}_{2002} + \varepsilon_t, \quad (1)$$

where R_t is the return for day t on the value-weighted market portfolio; REG_{2001} and REG_{2002} are dummy variables that equal to 1/3 for days within the event windows around the release of the 2001 and 2002 Regulations (March 15, 2001 and July 24, 2002, respectively) and zero otherwise.

Our sample period for estimating Eq. (1) is from the first trading day of 2000 (January 4) to the last trading day of 2002 (December 31), resulting in a window of 716 trading days. The sample forming the market portfolio includes all 1126 firms (with available data) listed on the two stock exchanges as of December 2002. Market return data are obtained from the China Stock Market and Accounting Research (CSMAR) trading database. The two coefficients, β_1 and β_2 , in (1) capture the cumulative mean-adjusted returns during the event windows around the release of the 2001 and 2002 Regulations, respectively. We expect β_2 to be significantly positive and greater than β_1 .

Model 1 in Table 3 presents the regression results of Eq. (1) using the three-day short windows. The results show that the coefficient on REG_{2002} (β_2) is significantly positive (with $p < 0.01$), i.e., the market reacted positively to the 2002 Regulation in the short window. This is consistent with our prediction that the market favored the introduction of the accounting-based regulation. The coefficient on REG_{2001} is insignificant (with a p -value of 0.640) and the magnitude is significantly less than the coefficient on REG_{2002} (with an F -value of 9.87). This is due to the fact that the 2001 Regulation did not set forth a rigorous numerical threshold to limit the number of firms that could conduct SEOs.

In Model 2 of Table 3, we add two interactive terms: $\text{REG}_{2001} * \text{DROE}$ and $\text{REG}_{2002} * \text{DROE}$, where DROE is defined as one if the portfolio consists of firms with ROE less than 10% and zero otherwise. Since the 2002 Regulation disqualified firms with ROE below 10% to issue new shares, investors in those firms were no longer subject to the adverse-selection problem from SEO. Thus, we expect the coefficient on $\text{REG}_{2002} * \text{DROE}$ to be positive, while that on $\text{REG}_{2001} * \text{DROE}$ to be no different from zero. Model 2 shows that both terms are not significantly different from zero at conventional levels (with p -values of 0.911 and 0.957, respectively). The estimated coefficient on REG_{2002} (β_2) remains significantly positive and significantly larger than that on REG_{2001} . Thus, the 2002 Regulation affects the overall market valuation due to its limitation of additional supplies of shares to the market.

⁶ Long windows are defined as one trading day before the CSRC release of the new regulation (or the draft of the new regulation) until one trading day after the regulation was first published in newspapers. The long window is necessary because the information about the regulation was released to a limited number of market participants including regional securities regulatory offices, the two stock exchanges, investment bankers, and listed companies. The restricted release of information makes it likely that many investors received the information only after the regulations were published in newspapers. However, the long windows are likely to include other news that might confound our results. Thus, we use the short-window test in Table 3. The long-window tests yield similar results.

Table 3
Stock price reactions to SEO regulations announced in 2001 and 2002

	Predicted sign	Model 1	Model 2
<i>Intercept</i>	,	0.000 (0.865)	0.000 (0.813)
REG_{2001}	,	0.012 (0.640)	0.012 (0.655)
$REG_{2001} * DROE$?		0.002 (0.957)
REG_{2002}	+	0.124*** (0.000)	0.116*** (0.000)
$REG_{2002} * DROE$	+		0.004 (0.911)
No. of observations		712	1432
Adj. <i>R</i> -square		3.02%	3.30%
<i>F</i> -value for difference between the coefficients on REG_{2001} and REG_{2002}		9.87***	9.65***

The table reports market reactions of SEO regulations announcements in China. The stock price reactions are estimated using the model below over the period from January 4, 2000, to December 31, 2002 ($t = 16$).

$$R_t = \beta_0 + \beta_1 * REG_{2001} + \beta_2 * REG_{2002} + \varepsilon_t, \quad (1)$$

$$R_t = \beta_0 + \beta_1 * REG_{2001} + \beta_2 * REG_{2001} * DROE + \beta_3 * REG_{2002} + \beta_4 * REG_{2002} * DROE + \varepsilon_t. \quad (2)$$

In model (1), R_t is the return for day t on the value-weighted market portfolio. In model (2), we decompose the market portfolio into one with firms with ROEs of 10% and above and one with firms with ROEs less than 10%. We compute R_t for both portfolios and then pool them together. $DROE$ is one if the portfolio consists of firms with ROEs less than 10% and zero otherwise. REG_{2001} and REG_{2002} are dummy variables that equal 1–3 for days within the event windows around the release of the 2001 and 2002 Regulations (March 15, 2001 and July 24, 2002, respectively) and zero otherwise. p -values are in parentheses. *** denotes significance level at 1% for two-tailed tests.

3.2. Market reactions to SEO announcements before and after the 2002 Regulation

To test the second prediction that the market reacted less negatively to the SEO announcements after the 2002 Regulation, we employ the event-study methodology summarized by Campbell, Lo, and MacKinnlay (1997). The event date (day zero) is defined as the date the firm makes an announcement of a proposal to issue additional shares.⁷ For each company, we use an event period of 300 days (starting at day -279 and ending at day $+20$ relative to day zero). The first 259 days in this period (-279 through -21) are designated as the “estimation period,” and the following 41 days (-20 through $+20$) are

The proposal is the first public information made available about a seasoned-equity offering in China. After approving the resolution, the board of directors should inform the exchange and announce the resolution including the SEO proposal and the notice on the holding of a general meeting in two working days. The proposal should disclose the relevant information such as the proportion of shares and the total number of shares to be issued, the pricing method of the issuing price, and the use of the funds to be raised. The announcement should be published in three major Chinese financial newspapers (*China Securities*, *Shanghai Securities News*, and *Securities Times*). Our event date is defined as the date the announcement is made in the newspapers.

designated as the “event period.” We use the following market model to specify the normal returns of security i as

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{2}$$

where R_{it} is the observed return for security i at day t , R_{mt} is the return on the value-weighted market index for day t , and ε_{it} is the zero mean disturbance term. For every security, the abnormal return (AR) for each event day is estimated as:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, \tag{3}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated values from applying the OLS regression to Eq. (2). The cumulative abnormal return (CAR) for a τ -day period is then calculated as:

$$CAR_{i,\tau} = \sum_{t=1}^{\tau} AR_{it}. \tag{4}$$

To test the null hypothesis that the mean cumulative abnormal return ($CAR_{i,\tau}$) is equal to zero, we use a t -statistic calculated as the ratio of the mean $CAR_{i,\tau}$ to its estimated standard deviation; the standard deviation is estimated from a time series of mean abnormal returns.

The sample includes 187 and 63 SEO proposal announcements made before and after the 2002 Regulation, respectively.⁸ Fig. 2 shows CAR of the two samples from day -20 to day $+20$. The figure indicates that CAR drop substantially in both samples around day zero and that the drop is steeper in the sample of announcements before the 2002 Regulation.

Panel A of Table 4 provides a statistical test of the difference in CAR of the 187 and 63 SEO announcements before and after the 2002 Regulation, respectively. The tests are conducted on two event windows: $(-1, +1)$ and $(-3, +1)$.⁹ The panel shows that CAR in both windows is significantly negative, indicating that investors generally understood the SEO announcements as bad news. This is similar to the results documented from other markets worldwide (Eckbo & Masulis, 1995). In addition, the panel shows that CAR before the 2002 Regulation were significantly more negative than those after the regulation, based on the non-parametric Wilcoxon test. For example, the median three-day CAR surrounding SEO proposal announcements made before July 2002 is -3.79% , which is significantly more negative (with a z -statistic of -2.09) than the median three-day CAR (-3.42%) surrounding announcements made after July 2002.

Due to the profitability threshold required in the 2002 Regulation, the firms announcing SEOs before and after this regulation were naturally different in terms of profitability and other characteristics. We control for the differences in firm characteristics in two ways. First, we limit the pre-2002-Regulation sample to those with ROEs above 10%. According to panel B of Table 4, CAR of this reduced sample is still more negative than those of the post-2002-Regulation sample, according the Wilcoxon z -statistics.

⁸ The sample is identified from a Chinese website (www.cnlist.com), which compiles all corporate announcements, including SEO proposal announcements, made by Chinese listed companies. Financial and regulated utilities companies and those that issued only foreign-currency denominated shares are excluded.

⁹ Tests using a longer window of up to seven days $(-5, +1)$ yield the same results.

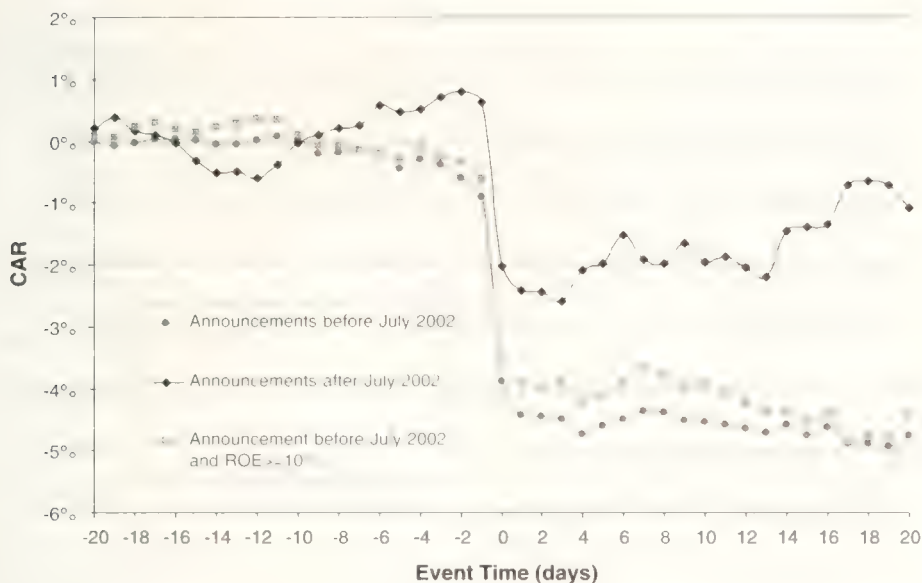


Fig. 2. Plot of cumulative abnormal returns surrounding the announcements of SFO proposals. The figure plots the cumulative abnormal returns (CARs) surrounding the SFO proposal announcements. The sample consists of 250 announcements made by China's listed companies during the period June 2000 to December 2004. The announcements are categorized into two groups, before July 2002 when there was no accounting-based regulation on SFO applications (187 announcements) and after July 2002 when there was an accounting-based regulation (63 announcements). The figure also plots a sub-sample of the former group, i.e., before July 2002 and ROE $\geq 10\%$ (97 announcements). The horizontal axis is the event day relative to the announcement day, and the vertical axis is the value of CARs.

The second approach we use to control for firm characteristics is to conduct a regression analysis using CAR as the dependent variable. The independent variables include a dummy variable *TIME* (equal to one if the SFO was announced after July 2002 and zero otherwise) and four firm-specific variables: cash flows from operations (*CFO*); the percentage of the number of additional shares to be issued according to the SFO proposal over the total number of existing shares (*SEOP*); financial leverage (*LEV*; total liabilities divided by total assets), and the natural logarithm of the book value of total assets to measure the size of the firm (*SIZE*). The regression results, together with a comparison of firm-characteristic variables, are reported in Table 5. Panel A of the table shows that in the pre-2002 sample, the characteristics of firms with ROEs above and below 10% are not different except in the variable of *CFO*. That is, firms with ROEs above 10% have more cash flow from operations than those with ROEs below 10%. In addition, between the firms with ROEs above 10%, the pre-2002 group has lower financial leverage (*LEV*) and smaller size (*SIZE*) than the post-2002 group. Panel B of Table 5 reports two regression models. Column (1) includes all 250 firms that announced SFO proposals before and after July 2002, and column (2) includes only firms that had a minimum ROE of 10% prior to their SFO announcements. It is seen that the dummy variable *TIME* is significant in both columns in Table 5. Thus, the inclusion of control variables does not change the basic result that the market reacted more negatively to SFO announcements made before

Table 4

Cumulative abnormal returns surrounding SEO proposal announcements made before and after the July 2002 Regulation

	Number of events	Average CAR (%)	Median CAR (%)	t-statistics (z-statistics)
<i>Panel A comparison of CARs for SEO announcements made before and after the July 2002 Regulation</i>				
Three-day window CAR (−1,+1)				
Before July 2002	187	−3.94	−3.79	
After July 2002	63	−3.22	−3.42	−2.10** (−2.09**)
Five-day window CAR (−3,+1)				
Before July 2002	187	−4.32	−3.81	
After July 2002	63	−2.94	−2.65	−2.19** (−2.12**)
<i>Panel B comparison of CARs for SEO announcements made before and after the July 2002 Regulation, for firms with ROE ≥ 10% only</i>				
Three-day window CAR (−1,+1)				
Before July 2002 and ROE ≥ 10%	97	−3.73	−3.20	
After July 2002 and ROE ≥ 10%	56	−2.57	−2.76	−2.32** (−2.02**)
Five-day window CAR (−3,+1)				
Before July 2002 and ROE ≥ 10%	97	−4.10	−3.60	
After July 2002 and ROE ≥ 10%	56	−2.29	−2.24	−2.06** (−2.05**)

The table reports the cumulative abnormal returns of various windows surrounding the SEO proposal announcements. The sample consists of 187 and 63 announcements made by China's listed companies during the period from June 2000 to June 2002 and July 2002 to December 2004, respectively. The market model using the CSMAR value-weighted market return is used for the normal returns. CAR is the sample average cumulative abnormal return for the specified event window. The last column reports *t*-statistics (Wilcoxon *z*-statistics) that are used to test the mean (median) CAR difference between the samples before and after July 2002. ** denotes significance at a level of 5% in two-tailed tests.

the 2002 Regulation than after. In addition, the difference in the market reactions to SEO announcements exists in firms that were qualified under both the new and the old regulations. In summary, the 2002 Regulation seems conducive to a less negative reaction by the market to SEO announcements.

3.3. Subsequent performance of SEO firms

In Section 2, we predicted that among the firms announcing SEO before the 2002 Regulation, those meeting the ROE threshold outperform, while those below the threshold underperform, the market after completion of their SEO. As in previous studies on post-SEO performance (e.g., Loughran & Ritter, 1997, December), we focus on the performance after the completion of the SEO. Since many firms did not complete the SEO proposals that they had announced, the sample is reduced from 187 to 65 firms, including 48 firms above the threshold and 17 below the threshold.¹⁰ In addition we measure performance using

¹⁰ That is, 51% of 97 firms with ROEs above 10% and 19% of 90 firms with ROEs below 10% completed their SEO proposals. Those that failed to complete the SEOs could have either abandoned the proposal voluntarily, or have had it rejected by the regulators. The large difference in the completion rates between the two groups indicates that Chinese regulators might have used the 10-percent hurdle as an implied criterion in the approval process.

Table 5
Cross-sectional regressions of CARs surrounding SEO announcements

Panel A descriptive statistics of independent variables

	Full sample	Sub-sample A	Sub-sample B	Sub-sample C	A vs. B (<i>t</i> - and <i>z</i> -stat)	A vs. C (<i>t</i> - and <i>z</i> -stat)
		Firms with ROE ≥ 10% and before July 2002	Firms with ROE < 10% and before July 2002	Firms with ROE < 10% and after July 2002		
CFO	0.061 (0.060)	0.065 (0.068)	0.043 (0.044)	0.085 (0.093)	1.90 (2.17)	1.27 (1.56)
SEOP	0.260 (0.228)	0.249 (0.221)	0.249 (0.221)	0.310 (0.238)	0.29 (−0.91)	1.80 (1.39)
LEV	0.464 (0.471)	0.443 (0.419)	0.435 (0.437)	0.537 (0.547)	0.31 (0.10)	−3.73 (−3.60)
SIZE	2.458 (1.332)	2.028 (1.278)	1.942 (1.254)	4.218 (2.571)	0.30 (0.68)	−2.47 (−2.67)

Panel B regression analysis

		(1)	(2)
	Predicted sign	All firms	Firms with ROE < 10%
Intercept	''	−0.182 (0.240)	−0.042 (0.847)
TIME	+	0.034** (0.026)	0.043** (0.033)
CFO	+	0.090 (0.119)	0.178** (0.035)
SEOP		−4.412 (0.326)	−6.108 (0.317)
LEV	''	−0.002 (0.958)	−0.029 (0.582)
SIZE	''	0.007 (0.389)	0.001 (0.949)
Number of obs		250	153
Adj. <i>R</i> -square		3.62%	7.12%

Panel A of this table presents descriptive statistics of independent variables used in the regressions. Mean and median values (in parentheses) are reported for the full sample and three sub-samples as well. The last two columns of Panel A report *t*-statistics for mean comparisons and signed rank *z*-statistics (in parentheses) for median comparisons among the three sub-samples. Statistics in bold indicate significant differences at a level of at least 5%. Panel B shows the results from regressing the 3-day cumulative abnormal returns (CAR) surrounding the SFO proposal announcement on the variables TIME, CFO, SEOP, LEV, and SIZE.

$$CAR_i = \beta_0 + \beta_1 * TIME_i + \beta_2 * CFO_i + \beta_3 * SEOP_i + \beta_4 * LEV_i + \beta_5 * SIZE_i + \epsilon_i$$

where TIME equals one if firm *i*'s SEO proposal was announced after July 2002 and zero otherwise, CFO is firm *i*'s cash flows from operations in the year prior to the announcement year scaled by concurrent average total assets, SEOP is firm *i*'s proposed number of shares for SFO over the total number of outstanding shares before announcement date, LEV is firm *i*'s leverage ratio (total liabilities over total assets), SIZE is firm *i*'s natural logarithm of book value of total assets at the end of year prior to the announcement year. Column (1) reports the regression results for 250 firms that announced SEO proposals and Column (2) reports the sub-sample of 153 firms in which all firms have a minimum ROE of 10% prior to their SFO proposal announcement year. *p*-values are in parentheses. ** denotes significance at a level of 5% in two-tailed tests.

market-adjusted returns (cumulative monthly stock returns minus cumulative monthly market index returns).

Table 6 shows that the pre-SEO stock returns were higher for firms whose ROEs were above 10% than for firms whose ROE were below 10%. The difference, however, does not reach statistical significance levels according to the Wilcoxon *z*-test. After the completion of the SEOs, the market-adjusted returns of firms above the 10% threshold are positive in the 12 and 24-month intervals (6.71% and 9.48% respectively), while the market-adjusted returns of the firms below the threshold are negative in the same two intervals (−11.65%

Table 6

Comparison of pre- and post-SEO market-adjusted returns (%)

	2 years before	1 year before	Issuing year	1 year after	2 years after
Above threshold	28.85	8.15		6.71	9.48
Below threshold	3.04	−0.43	−	−11.65	−6.45
Wilcoxon <i>z</i> -statistics	1.77	1.50	−	3.22***	2.15**

This table reports pre- and post-SEO stock returns of firms that had completed SFO before July 2002 when there was no strict hurdle of ROE as an SFO qualification. The sample consists of 65 firms, including 48 firms with minimum ROEs of 10% in the preceding year and 17 firms below the threshold. The market-adjusted return is measured as the cumulative daily market-adjusted stock returns. *z*-statistics for the Wilcoxon signed-rank test of median difference between two groups are also provided. ** and *** denote the significance level of 5% and 1% for two-tailed tests, respectively.

and −6.45% respectively).¹¹ All the post-SEO return measures are significantly different from zero according to unreported *t*-statistics. Moreover, the differences between the two groups' market-adjusted returns are significant during each of the two intervals. That is, the firms above the 10% threshold significantly outperform those below the threshold up to at least 2 years after the completion of the SEO. These results indicate that firms below the threshold are more likely than firms above the threshold to conduct SEO at the peak of their stock prices. Since underperformance in the post-SEO period is typically taken as an indication of the adverse-selection problem (e.g., Loughran & Ritter, 1997, December), Table 6 demonstrates that the problem is less severe in firms above the threshold than in firms below the threshold.¹²

4. Conclusion

In China, listed companies are required by regulations to achieve a minimum return on equity (ROE) before they can apply for permission to issue additional shares through rights issues or seasoned-equity offerings (SEO). Although such accounting-based regulations have led to clear earnings-management behavior, the Chinese government still maintains the threshold requirement even today.

We document two possible benefits of this accounting-based regulation for China, an emerging market: (1) to limit the supply of shares and the dilution of existing share prices and (2) to reduce adverse selection in the SFO. As evidence for the first benefit, we find that the Chinese stock market reacted positively to the announcement of the accounting-based regulation. Moreover, among firms with ROE above the threshold, the market reaction to their SFO announcements was less negative after the accounting-based regulation went into effect. As evidence for the second benefit, we find that firms below the ROE threshold underperform the market after their SFO, much like what has been observed in other

The finding that SFO firms whose ROEs were above the threshold outperformed the market after their SFO is consistent with Wang, Wei, and Pruitt's (2006) finding that China's rights-issuing firms' stock returns outperformed those of control firms after the rights issue. But Wang et al.'s (2006) sample includes firms whose ROE was above the threshold only.

Since our purpose in Table 6 is to investigate whether firms time the market to conduct SFOs when their stock prices are relatively high, we do not examine the accounting-based performance measures.

markets; those above the threshold outperform the market. That is, the accounting-based regulation is able to reduce the adverse-selection problem in which firms conduct SEO when their stocks are overvalued.

Positive accounting theory predicts that regulations based on accounting numbers create incentives for managers to manipulate their accounting numbers (Watts & Zimmerman, 1990). Chen and Yuan (2004) have shown that China's accounting-based regulations led to some resource misallocation. Our paper extends that study by showing that the regulations seem to achieve some useful objectives in China's particular investment environment. Our study also explains why the accounting-based regulations still exist given the manipulation behavior they create.

Finally, one important limitation should be pointed out. That is, our objective is to examine whether the adverse-selection problem is reduced by using an ROE cut-off relative to the regulatory regime in which no cut-off was imposed. It could be argued, however, that a measure such as market-to-book ratio might be a better measure for regulators to reduce the adverse-selection problem; but this is beyond the scope of this study.

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Does the financial analysts' usage of non-financial information influence the analysts' forecast accuracy? Some evidence from the Belgian sell-side financial analyst

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Abstract

This paper examines whether the use of non-financial information by sell-side financial analysts influences the accuracy of analysts' forecasts. The research findings, based on a survey of Belgian financial analysts, suggest that financial analysts who use more forward-looking information and more internal-structure information offer more accurate forecasts. Furthermore, the listed Belgian firms examined in this study have improved their non-financial information reporting over time. However, neither the frequency nor the quantity of non-financial information mentioned by financial analysts in their reports appears to have increased over time.

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Keywords: Analyst reports; Annual reports; Disclosure; Financial analysts' forecast accuracy; Non-financial information; Non-financial information use

1. Introduction

Earlier research emphasizes the important role of sell-side financial analysts on capital markets (Barker, 1998; Holland & Johansson, 2003; Covrig & Low, 2005). By means of

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their analyses, earnings forecasts and recommendations, financial analysts have a significant influence on the investment community. However, investors have to be cautious when making investment decisions based on analysts' predictions because earnings forecasts tend to be optimistic (Capstaff, Rees, & Paudyal, 1998; Duru & Reeb, 2002; Gu & Wu, 2003) and dispersed (Stickel, 1992; Sinha, Brown, & Das, 1997). Numerous studies (e.g., Clement, 1999; Jacob, Lys, & Neal, 1999; Brown, 2001) document that the differences in the forecast accuracies are influenced by various factors as, for instance, the years of experience of the financial analyst, the number of companies followed by the financial analyst, or the size of the company assessed by the financial analyst.

The extent to which financial analysts use corporate information is rarely judged. This may be surprising, especially since analysts require firms to voluntarily disclose more information. In this study we examine whether or not financial analysts really use the information that is voluntarily disclosed by listed firms and if so whether its use influences the analysts' forecast accuracy.

Moreover, this paper concentrates on voluntary non-financial information. This type of information can be defined as "all information disclosed outside the financial statements issued by the company" (Robb, Single, & Zarzeski, 2001). Prior research (Amir & Lev, 1996; Ittner & Larcher, 1999; Lev & Zarowin, 1999; Graham, Cannice, & Sayre, 2002; Beretta & Bozzolan, 2004; Liang & Yao, 2005) documents the increased relevance of non-financial information due to increased competition and globalization, technological developments, and the introduction of new businesses. When financial analysts predict future earnings, they have to rely on non-financial information such as the future activities of the company or the acquisitions realized by the company. Vanstraelen, Zarzeski, and Robb (2003) find that the disclosure of non-financial forward-looking information positively influences the accuracy of the analysts' earnings forecasts.

The purpose of this paper is to directly relate the analysts' use of information and their forecast accuracy. Our study is similar to McEwen and Hunton (1999) with one major difference: we examine non-financial information while McEwen and Hunton concentrate on financial information.

This research topic is important for the following reasons. First, corporate managers are interested in the extent to which financial analysts actually use the non-financial information published by the companies. More importantly managers want to know whether the analysts' use of reported information really influences their forecasts. By studying this relationship, corporate managers may be able to enhance their disclosure strategy in regard to information that might influence the output of financial analysis. Besides, earlier studies have examined the benefits to the firms such as lowering cost of capital or increasing firm value as a result of disclosing more relevant information (Sengupta, 1998; Lang, Lins, & Miller, 2003; Richardson & Welker, 2001).

In addition, analysts and regulators have another consideration. In particular, do regulator's requirements fulfill the information needs of financial analysts and, if not, which changes are needed?

La Porta, Lopez-de-Silanes, Schleifer, and Vishny (1997) distinguish two legal systems: the civil-law system and the common-law system. Legislation in the latter system (as in the United States and the United Kingdom) is based on judgments, whereas legislation in the civil-law system is part of a scholar- and legislator-made tradition. Due to differences within

the civil-law countries, La Porta et al. (1997) subdivide them into three groups: the French civil-law system (e.g., Belgium, France, Spain), the German civil-law system (e.g., Germany, Japan), and the Scandinavian or the Nordic civil-law system (e.g., Norway, Sweden). Based on prior literature findings, Table 1 provides a comparison of various environmental and institutional characteristics between the four legal systems (Belgium's scores are included for comparison).

Legal systems differ in terms of the amount of required disclosure. La Porta, Lopez-de-Silanes, and Schleifer (2006) found that companies in common-law countries provide more information than companies in civil-law countries. The system in Belgium, as well as the majority of French civil-law countries, does not oblige companies to report as much information as in the common-law countries.

Table 1 shows further that the legal rules protecting investors and creditors differ between countries. Shareholders and creditors are most protected in common-law countries, while these stakeholders are least protected in the French civil-law countries (La Porta, Lopez-de-Silanes, Schleifer, & Vishny, 1998); shareholders in Belgium, for example, do not possess any rights included in the La Porta et al. measurement while creditors are moderately supported. However, based on the liability standard, La Porta et al. (2006) demonstrate that investors in Belgium are more protected compared to average investors in the French and German civil-law countries, but are less protected compared to the average common-law and Nordic civil-law countries.

To be effective, enforcement of these regulations is essential. La Porta et al. (1998) proxy the quality of law enforcement by the characteristics of the judicial system, rule of law, corruption, risk of expropriation and contract repudiation by governments. They demonstrate that the quality of law enforcement is the highest in Nordic and German civil-law countries, followed by common-law countries, with the lowest being the French civil-law countries. In Belgium, however, the quality of law enforcement is similar to that in Nordic and German civil-law countries. Yet, the picture is less favorable when comparing Belgium's scores on the other measurements of enforcement developed by Mueller, Gernon, and Meek (1994), Hope (2003), or La Porta et al. (2006). All these studies show that Belgium scores very low in comparison with the average civil- and common-law countries.

The low-level investor protection may induce management to manipulate accounting results. In fact, Leuz, Nanda, and Wysocki (2003) show that companies in French and German civil-law countries manipulate their earnings to a larger extent when compared to companies in common-law and Nordic civil-law countries. The situation in Belgium is very comparable to the average French civil-law country. In addition, La Porta et al. (1998) document that countries with low investor protection have more concentrated ownership structure: the ownership structure in Belgium is less dispersed compared to companies operating in common-law, Nordic civil-law and German civil-law countries (Table 1). These factors taken together might explain the limited importance of equity markets in these countries. In general, however, the information environment has not reached the level of the capital markets in the other legal structures.

Finally, Belgium is characterized in Hofstede's (2001) comparison of cultures by a high level of both power distance, and uncertainty avoidance, a position very comparable to other French civil-law countries. But, in contrast to the average French civil-law countries,

Table 1
Comparison of the information, institutional and cultural environment between Belgium and the four legal systems

Characteristic	Source	Description	Belgium (French civil)	Mean French civil	Mean German civil	Mean Nordic civil	Mean English common
Disclosure requirements	La Porta et al (2006)	Information requirements such as prospectus delivered at an IPO and information about compensation of directors, ownership structure, inside ownership by directors, irregular contracts and transactions between the issuer and related parties	0.42	0.42	0.60	0.56	0.78
Protection of shareholders and investors							
Antidirector rights	La Porta et al (1998)	Index aggregating shareholder rights such as then permission to vote by mail, the prohibition of blocking shares for the shareholders' meeting or the incidence of laws protecting oppressed minorities	0	1.76	2.00	2.50	3.39
Creditor rights	La Porta et al (1998)	Index aggregating creditor rights such as the prohibition of secured investors having an automatic stay on assets when a reorganization occurs, the requirement to pay secured creditors first or the replacement of management by an reorganization	2	1.58	2.33	2.00	3.11
Liability standard	La Porta et al (2006)	The extent to which an investor is able to recover losses from the issuer, the directors, the distributors and the accountant when misleading information is included in the prospectus	0.44	0.39	0.42	0.47	0.58
Quality of law enforcement							
Judicial efficiency	La Porta et al (1998)	The efficiency and integrity of the legal environment as it affects business	9.50	6.56	8.54	10.00	8.15
Rule of law	La Porta et al (1998)	Assessment of the law and order tradition in the country	10.00	6.05	8.68	10.00	6.46
Corruption	La Porta et al (1998)	The corruption of a country (the lower the score, the higher the level of corruption)	8.82	5.84	8.03	10.00	7.06
Risk of expropriation	La Porta et al (1998)	The risk of outright confiscation or forced nationalization	9.63	7.46	9.45	9.66	7.91

Reputation of contract by government	La Porta et al (1998)	The risk of a modification in a contract taking the form of a postponement or scaling down	9.48	6.84	9.47	9.44	7.41
Audit spending	Muellet et al. (1994)	Assessment of how much a country spends on audit services relative to the economy	0.18	0.48	0.25	0.23	0.28
Enforcement Hope	Hope (2003)	Degree of enforcement based on audit spending, judicial efficiency, rule of law, insider trading laws and anti director rights	1.89	2.25	1.20	0.12	0.09
Public enforcement	La Porta et al (2006)	Index including characteristics of the supervisor of securities markets, the power of the supervisor to issue rules, the investigative power of the supervisor and sanctions	0.15	0.53	0.25	0.38	0.62
Earnings management score	Leuz et al (2003)	Average score on the level of earnings management	19.50	19.27	23.60	10.15	11.74
Ownership structure	La Porta et al (1998)	Mean ownership by the three largest shareholders of the 10 largest nonfinancial domestic firms	0.54	0.54	0.34	0.37	0.43
Importance equity markets							
External capitalization GNP	La Porta et al (1997)	The ratio of stock market capitalization held by minorities to gross national product in 1994	0.17	0.21	0.46	0.30	0.60
Domestic firms population	La Porta et al (1997)	The ratio of the number of domestic listed firms in a given country to its population in 1994	15.50	10.00	16.79	27.26	35.45
IPO population	La Porta et al (1997)	The ratio of the number of IPOs of equity in a given country to its population in 1994	0.30	0.19	0.12	2.14	2.23
Culture							
Power distance	Hofstede (2001)	The extent to which people accept an unequal, hierarchical distribution of power	65	65.89	42.00	28.25	49.23
Uncertainty avoidance	Hofstede (2001)	The degree to which people feel uncomfortable with ambiguity and an uncertain future	94	80.37	73.17	40.25	44.38
Individualism	Hofstede (2001)	The degree of integration among members in a society	75	37.89	45.17	69.25	57.77
Masculinity	Hofstede (2001)	The preference for achievement, heroism, assertiveness and material success	54	49.89	65.67	13.75	56.77

Belgium also scores high on individualism. Regarding the masculinity variable, Belgium is comparable to the average French civil-law country.

There are two important implications to be drawn from our multi-country analysis. First, as the level of disclosure requirements is quite low in Belgium, it can be assumed that other disclosures by Belgian companies are voluntary in response to demands from various stakeholders. The extent to which this voluntary disclosure extends to non-financial information is one objective of this study. Second, the less protected investors or shareholders and the lower information requirements are, the more that investors are likely to rely on financial analysts. This statement is empirically supported by Covrig and Low (2005) for financial analysts and Japanese companies (characterized by a low-quality financial-reporting system). It is, therefore, possible that financial analysts following Belgian companies also exert a greater influence on the decision made by the investment community. Indeed, Sercu and Sips (1993) and Engelen (1999) observe that investors benefit from following the recommendations of financial analysts.

Our research findings demonstrate that listed Belgian companies voluntarily provide additional non-financial information in annual reports over time. Nevertheless, this improvement does not result in an increase in the overall amount of non-financial information provided in the analyst reports, except for the amount of forward-looking information and information about the internal structure of companies. The analysis also reveals that those financial analysts relying more on these information items make more accurate forecasts.

The outline of the remainder of this paper is structured as follows. Section 2 reviews some prior literature findings and states some hypotheses. Section 3 discusses the research design; section 4 presents the research findings. The final section summarizes the paper and provides some questions for further research.

2. Theoretical framework and hypotheses

Before discussing the main research question, we need to generate base information and review literature about the following sub-research questions:

- (1) Which voluntary non-financial information do the listed firms disclose and whether the amount of their disclosure evolved during the years under study?
- (2) Which voluntary non-financial information do financial analysts use and how the amount has evolved during the years under study?
- (3) Are corporate managers making an effort to disclose more non-financial information in the information categories that financial analysts find important?

With respect to the first sub-research question, Beattie, McInnes, and Fearnley (2002) examine the annual reports of 11 British companies and observe that these companies provide much descriptive information as well as information about management and shareholders. On the other hand, managers give less attention to forward-looking information and information about reasons for changes in performance. Similar research findings are observed in Vanstraelen et al. (2003) for 120 Belgian, Dutch, and German companies. Other studies focus on the disclosure of intellectual capital (IC) information. Guthrie and Petty (2000), for example, analyze the annual reports of the 20 largest Australian companies and find that firms report more

information about their external structure (e.g., brand names, customer loyalty) compared to internal structure (e.g., patents, research and development) and human capital (e.g., education, know-how). The same conclusions are in Bozzolan, Favotto, and Ricerni (2003) that examines the IC information reporting of 30 Italian firms, and in Brennan (2001) for 11 Irish firms.

Over time, there appears to be an increase in the disclosure of non-financial information as shown by Moneva and Llena (2000) for environmental information in the annual reports of 70 Spanish companies and by Marston and Polei (2004) for both environmental and corporate governance information on the websites of 50 German companies. Vandemaele, Vergauwen, and Smits (2005) find that the top 20 listed companies of the Netherlands, Sweden, and the United Kingdom report more IC information over the period 1998–2000, while no significant change was found for the period 2000–2002. Abdolmohammadi (2005) concentrates his study on 58 United States companies and shows an improvement in the disclosure of IC information over the period 1993–1997.

The major consequence of reporting voluntary non-financial information seems to be a reduction in the information asymmetry (Lang and Lundholm, 2000; Brown, Hillegeist, & Lo, 2004; Guo, Lev, & Zhou, 2004), which leads to a reduction of the risk of investing in the reporting company. This diminished risk in turn improves the liquidity of the companies' shares (Healy, Hutton, & Palepu, 1999; Leuz and Verrecchia, 2000). Consequently, more efficient investment decisions can be obtained (Gray, Radebaugh, & Robert, 1990). Another benefit appears to be a decrease in the firms' cost of capital (Welker, 1995; Francis, Khurana, & Pereira, 2005). Sengupta (1998) documents that a policy of timely and detailed disclosures results in a decrease of the cost of debt for the company. Botosan (1997), Botosan and Plumlee (2002), and Hail (2002) demonstrate that an increased reporting of voluntary information in annual reports is associated with a lower cost of equity. Healy and Palepu (1993) further suggest that financial analysts are more convinced about the reliability of mandated information when companies also disclose voluntary information. Moreover, financial markets continue to demand more information in order to make investment decisions (Grüning & Stöckmann, 2004; Kristensen and Westlund, 2004).

The Financial Services Action Plan that was launched by the European Commission in 1999 aims at improving the functioning of pan-European capital markets by 2005 as noted in Directive 2004/109 EC on the harmonization of transparency requirements following an earlier directive (Directive 2001/34 EC on the admission of securities to official stock exchange listing and on information to be published on those securities). Listed Belgian companies are, for instance, required to publish a separate annual report including financial statements along with a management's discussion and analysis. This directive is integrated into the Belgian law by the issuance of the Royal Decree of March 31, 2003. Although these requirements are mainly financial, listed firms are also disclosing more non-financial information on a voluntary basis due to their perceived beneficial effects. These arguments lead to the following hypothesis (stated in the alternative form):

H1. The disclosure of voluntary non-financial information by listed firms is increasing over time.

To gain insight into the use of non-financial information by financial analysts, several studies examined the "contents" of the financial analysts' reports. Among the first studies to

analyze the content of analyst reports are Previts, Bricker, Robinson, and Young (1994) and Rogers and Grant (1997). Both studies observe that financial analysts pay limited attention to non-financial information. Nielsen (2005) finds that analysts' reports contain detailed background information about the company, but intellectual capital information is infrequently discussed. García-Meca and Martínez (2007) also observe a limited reliance on intellectual capital information (human capital, innovation, research and development projects), and report that financial analysts rely mainly on information about company strategy. Breton and Taffler (2001) find that financial analysts frequently use non-financial information about market conditions. The survey results in Dempsey and Gatti (1997) indicate that financial analysts often rely on non-financial performance measurements to judge the value of the company; Ho and Wong (2004) document that financial analysts mainly use information about a company's future prospects, market share, and acquisitions or disposals.

Recent studies (e.g., Nielsen, 2005; García-Meca & Martínez, 2007) point out the growth in the use of non-financial information by financial analysts over time. Due to technological developments, increased competition among companies, globalization, and the introduction of new business, non-financial information is gaining in importance for judging the value of a company (Amir & Lev, 1996; Lev & Zarowin, 1999; Graham et al., 2002; Beretta & Bozzolan, 2004). Thus, even if firms may not provide more non-financial information over time, it can be assumed that financial analysts will search for such information. This gives rise to the following hypothesis (stated in the alternative form):

H2. The use of voluntary non-financial information by financial analysts is increasing over time.

Hirst, Koonce, and Simko (1995), Ackert, Church, and Shehata (1996) and Womack (1996) document that the investment community relies to a large degree on the analyses and recommendations made by financial analysts. It is, therefore, expected that the disclosure of voluntary non-financial information will mainly be directed to those categories that analysts find important. However, as Nielsen (2005) observes, annual reports include more intellectual capital, corporate governance and social and sustainability information compared to analyst reports. Conversely, financial analysts refer more often to segment information and background information about the company. Due to the financial analysts' influence on corporate managers, we posit the following hypothesis:

H3. Corporate managers make an effort to disclose more non-financial information in those categories that financial analysts mention more frequently in analyst reports.

Plumlee (2003) makes reference to a large number of studies showing that financial analysts fail to include all information in their analyses. Numerous studies relate the level of forecast accuracy to firm-specific attributes such as the level of disclosure of listed companies (Vanstraelen et al., 2003) or the complexity of the information reported (Plumlee, 2003). Other studies relate differences in forecast accuracy to analyst-specific attributes such as experience or task complexity (Jacob et al., 1999; Brown, 2001). McEwen and Hunton (1999) find that the use of key ratios (share-price information and five-year earnings summary) is positively associated with the analysts' forecast accuracy. Conversely, the

analysts who rely merely on financial statement information (information from the balance sheet or the footnotes) are forecasting less accurately.

Some studies document the relationship between the disclosure of non-financial information and the analysts' forecast accuracy. In particular, Vanstraelen et al. (2003) show a positive relationship between the reporting of non-financial forward-looking information by Belgian, Dutch, and German firms and the analysts' forecast accuracy. The empirical study by McEwen and Hunton (1999) demonstrates that financial analysts make more accurate forecasts when they use more information than what is included in the financial statements. Since non-financial information is defined as all information disclosed outside the financial statements of a company, we posit the hypothesis that financial analysts who employ more non-financial information are forecasting more accurately.

H4. The financial analysts' usage of voluntary non-financial information is positively related to his/her forecast accuracy.

3. Research design

In the first stage of our research, we study the content of annual reports since these reports are an important source of information for financial analysts (Vergoossen, 1993; Blij, 2001; Ho & Wong, 2001). The narrative sections of the annual reports of 2001, 2003 and 2005 are examined. The sample contains all listed Belgian companies that have a market capitalization of more than 75 million euro at the end of the fiscal year 2005, excluding banks, insurance companies, holding and real estate companies, and have annual reports for all periods. The final sample consisted of 40 annual reports for each year.

We examine the financial analysts' use of voluntary non-financial information by first studying the analysts' reports that are made public after the issuance of the 2001, 2003, and 2005 annual reports for each of the 40 listed companies in the sample. That is, the content of company reports¹ that were issued by financial analysts of local Belgian brokerage firms, was investigated. If a financial analyst published more than one report following the issuance of annual reports in the years of study, only the first one was used in the sample. The final sample comprised 52 analyst reports issued in 2002, 63 analyst reports issued in 2004, and 62 analyst reports issued in 2006.

To research the content of the annual reports and the analysts' reports, we use a disclosure index that relies heavily on the information items recommended by the *American Institute of Certified Public Accountants (AICPA)* and the *Financial Accounting Standards Board (FASB)*. Studies such as Rogers and Grant (1997) or Nielsen (2005), among others, base their disclosure indexes on these recommendations as well.

In 1994, the AICPA established a reporting model which includes a comprehensive set of relevant corporate financial and non-financial information that users of corporate information are thought to require. This reporting model consists of a limited number of recommendations classified into five information categories: (a) business data, (b) management's analysis of

¹ In general, two types of analyst reports can be considered: result reports and company reports. The latter contain lots of corporate information in order to make a fundamental analysis of the company, while the first only discuss an event taking place in the company, hereby limiting the amount of information in such reports.

financial and non-financial data, (c) forward-looking information, (d) information about management and shareholders, and (e) background information about the company. Four of these five information categories contain information of a largely non-financial nature; only the category “business data” mainly contains financial data. To this, the FASB (2001) recommended adding information about the firm’s intangibles.

For this study, the disclosure index contains five information categories. Four of them are based on the AICPA recommendations. The fifth information category includes non-financial information indicators as recommended by the FASB (2001) paper plus the non-financial information indicators of the “business data” information category of the AICPA (1994) paper. In our study, we call this information category “intellectual capital information”. To summarize, our disclosure index consists of 71 information items assigned to the following five information categories:

- Management’s analysis of financial and non-financial data (ANA): 11 items;
- Forward-looking information (FWL): 11 items;
- Information about management and shareholders (MAN): 6 items;
- Background information about the company (BI): 23 items;
- Intellectual capital information (IC): 20 items.

These 71 non-financial information items are summed up in column 1 of Table 2 as shown.

In Table 2, some of the information categories are divided into two or three sub-categories such as the items of the information categories ANA and BI. If an annual report or an analyst report incorporates an item, it gets the value “one”, and otherwise “zero”.²

In the second stage of the study, we have sent a questionnaire to all sell-side financial analysts employed by a Belgian brokerage house who were also included in our sample of analysts’ reports. The questionnaire contained the same list of non-financial information items used in the content analysis noted earlier. Each analyst had to indicate on a five-point Likert scale, ranging from zero (“never used”) to four (“always used”),³ the extent to which (s)he uses each item in the analysis of the companies (s)he follows. The questionnaire also contained some demographic questions for the analyst such as the number of years of experience and the number of companies followed. The survey mailing resulted in 31 responses, a response rate of 63%.

The analysts’ forecast accuracy was measured as the absolute value of the difference between the actual earnings per share (EPS) and the forecasted EPS divided by the actual EPS (Fort, 1997; Capstaff et al., 1998; Ho & Tsay, 2004). The data was obtained from the database AQUITE. This database provides data about the performance of financial analysts all over the world for the listed companies they follow. Both the survey results and the disclosure index of the content analysis were related to the mean earnings forecast accuracy.

² This binary coding scheme is often criticized, as it does not take into account the differences in importance attached to the various information items. However, previous studies found similar results whether or not the information items were weighted (Cooke, 1989; Marston and Shrivs, 1991; Meek et al., 1995).

³ The Likert scale is composed as follows: zero = “never used”, one = “rarely used”, two = “sometimes used”, three = “often used”, four = “always used”. The questionnaire can be obtained from the authors.

Table 2

Frequency table of the disclosure and the usage of voluntary non-financial information

Column 1 information items	Column 2 annual reports 2001	Column 3 annual reports 2003 (change from 2001)	Column 4 annual reports 2005 (change from 2001)	Column 5 analyst reports 2002	Column 6 analyst reports 2004 (change from 2002)	Column 7 analyst reports 2006 (change from 2002)
	A 40	A 40	A 40	A 52	A 63	A 62
<i>Category 1 management's analysis of financial and non financial data (1A1)</i>						
ANA 1 Reasons for changes in the financial operating and performance related data						
ANA 1 Reasons identified by management for changes in volume of units sold or in revenues	88 ^a	8 ^a	10 ^a	77 ^a	2 ^a	15 ^a
ANA 2 Reasons identified by management for changes in innovation	33 ^a	5 ^a	8 ^a	17 ^a	6 ^a	6 ^a
ANA 3 Reasons identified by management for changes in profitability	85 ^a	3 ^a	8 ^a	81 ^a	11 ^a	8 ^a
ANA 4 Reasons identified by management for changes in long-term financial position	40 ^a	18 ^a	18 ^a	44 ^a	0 ^a	6 ^a
ANA 5 Reasons identified by management for changes in short-term liquidity and financial flexibility	30 ^a	3 ^a	3 ^a	8 ^a	11 ^a	25 ^a
ANA 6 Unusual or nonrecurring events and their past effect on the company	28 ^a	3 ^a	3 ^a	13 ^a	14 ^a	17 ^a
ANA B The identity and past effect of key trends Social trends and their past effect on the company	15 ^a	5 ^a	8 ^a	17 ^a	6 ^a	8 ^a
ANA 8 Demographic trends and their past effect on the company	0 ^a	10 ^a	8 ^a	0 ^a	0 ^a	6 ^a
ANA 9 Political trends and their past effect on the company	3 ^a	0 ^a	8 ^a	6 ^a	4 ^a	1 ^a
ANA 10 Macro economic trends and their past effect on the company	58 ^a	13 ^a	5 ^a	46 ^a	8 ^a	16 ^a
ANA 11 Regulatory trends and their past effect on the company	5 ^a	18 ^a	20 ^a	17 ^a	8 ^a	4 ^a

a continued on next page.

Table 2 (continued)

Column 1	information items	Column 2 annual reports 2001 N=40	Column 3 annual reports 2003 (change from 2001) N=40	Column 4 annual reports 2005 (change from 2001) N=40	Column 5 analyst reports 2002 N=52	Column 6 analyst reports 2004 (change from 2002) N=63	Column 7 analyst reports 2006 (change from 2002) N=62
<i>Category II forward-looking information (FBI)</i>							
FWI 1	The future risks of the company	30% _a	+13% _a	+55% _a	73% _a	+3% _a	+11% _a
FWI 2	The future opportunities of the company	58% _a	+8% _a	+33% _a	77% _a	+12% _a	+7% _a
FWI 3	The effects of the risks and opportunities on the business's future earnings and future cash flows	8% _a	+8% _a	+30% _a	44% _a	14% _a	9% _a
FWI 4	The activities and plans to meet the broad objectives and business strategy	83% _a	0% _a	18% _a	69% _a	+5% _a	+5% _a
FWI 5	The conditions that must occur within the business that management believes must be present to meet the broad objectives and business strategy	20% _a	+5% _a	+15% _a	21% _a	10% _a	3% _a
FWI 6	The conditions that must occur in the external environment that management believes must be present to meet the broad objectives and business strategy	18% _a	10% _a	+3% _a	25% _a	15% _a	9% _a
FWI 7	The comparison of actual business performance to previously disclosed opportunities, risks and plans of the company	18% _a	+20% _a	+13% _a	21% _a	+30% _a	+48% _a
FWI 8	New products launched in the next years	30% _a	+13% _a	+23% _a	44% _a	6% _a	-9% _a
FWI 9	The expectations about the future growth of the company	53% _a	+10% _a	+20% _a	85% _a	+3% _a	+2% _a
FWI 10	The evolution of future macro-economic indicators (e.g. economic climate, exchange rates) and the effect on the company	13% _a	+23% _a	+23% _a	40% _a	15% _a	-15% _a
FWI 11	The future production capacity of the company	18% _a	+18% _a	+33% _a	33% _a	+2% _a	0% _a

Table 2 (continued)

Column 1	information items	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
		annual reports, 2001	annual reports 2003 (change from 2001)	annual reports 2005 (change from 2001)	analyst reports 2002	analyst reports 2004 (change from 2002)	analyst reports 2006 (change from 2002)
		N = 40 V = 40	N = 40 V = 40	N = 40 V = 40	N = 52 V = 52	N = 63 V = 63	N = 62 V = 62
BI 15	The availability or scarcity of supply of products or services	3 ⁰ ₀	0 ⁰ ₀	0 ⁰ ₀	8 ⁰ ₀	+ 2 ⁰ ₀	3 ⁰ ₀
BI 16	The relative bargaining power of suppliers	3 ⁰ ₀	+ 3 ⁰ ₀	0 ⁰ ₀	0 ⁰ ₀	+ 5 ⁰ ₀	+ 6 ⁰ ₀
BI 17	The dominant customers of the company	25 ⁰ ₀	+ 5 ⁰ ₀	+ 18 ⁰ ₀	25 ⁰ ₀	1 ⁰ ₀	11 ⁰ ₀
BI 18	The extent that the business is dispersed among its customers	33 ⁰ ₀	+ 5 ⁰ ₀	+ 15 ⁰ ₀	21 ⁰ ₀	+ 11 ⁰ ₀	+ 11 ⁰ ₀
BI 19	The relative bargaining power of customers	3 ⁰ ₀	3 ⁰ ₀	+ 5 ⁰ ₀	2 ⁰ ₀	+ 11 ⁰ ₀	+ 21 ⁰ ₀
BI 20	The major competitors of a company	18 ⁰ ₀	0 ⁰ ₀	+ 5 ⁰ ₀	75 ⁰ ₀	10 ⁰ ₀	22 ⁰ ₀
BI 21	The intensity of the competition	53 ⁰ ₀	13 ⁰ ₀	+ 5 ⁰ ₀	65 ⁰ ₀	− 7 ⁰ ₀	1 ⁰ ₀
BI 22	The competitive position	60 ⁰ ₀	+ 10 ⁰ ₀	+ 5 ⁰ ₀	67 ⁰ ₀	+ 3 ⁰ ₀	8 ⁰ ₀
BI 23	The ability of new companies to enter the business	5 ⁰ ₀	+ 5 ⁰ ₀	+ 5 ⁰ ₀	17 ⁰ ₀	+ 2 ⁰ ₀	4 ⁰ ₀

Category 1: intellectual capital information (IC)

IC 1	Human capital	48 ⁰ ₀	+ 8 ⁰ ₀	8 ⁰ ₀	27 ⁰ ₀	9 ⁰ ₀	22 ⁰ ₀
IC 2	Employee compensation	40 ⁰ ₀	+ 8 ⁰ ₀	+ 18 ⁰ ₀	0 ⁰ ₀	+ 5 ⁰ ₀	+ 2 ⁰ ₀
IC 3	The education and training programs of employees	25 ⁰ ₀	+ 8 ⁰ ₀	+ 13 ⁰ ₀	4 ⁰ ₀	+ 9 ⁰ ₀	+ 7 ⁰ ₀

IC 4	Staff policy	38 ⁰ ₀	-13 ⁰ ₀	0 ⁰ ₀	+3 ⁰ ₀	+2 ⁰ ₀
IC 5	Job rotation	15 ⁰ ₀	-15 ⁰ ₀	+3 ⁰ ₀	2 ⁰ ₀	2 ⁰ ₀
IC 6	Employee satisfaction	10 ⁰ ₀	-3 ⁰ ₀	0 ⁰ ₀	0 ⁰ ₀	-2 ⁰ ₀
IC 7	Management quality	0 ⁰ ₀	+3 ⁰ ₀	+18 ⁰ ₀	5 ⁰ ₀	+5 ⁰ ₀
IC B	Internal structure					
IC 8	Company productivity	18 ⁰ ₀	+20 ⁰ ₀	+25 ⁰ ₀	1 ⁰ ₀	+3 ⁰ ₀
IC 9	Innovation (e.g. new products, new production processes)	88 ⁰ ₀	+5 ⁰ ₀	+8 ⁰ ₀	+10 ⁰ ₀	+17 ⁰ ₀
IC 10	Important patents, trademarks or licenses	28 ⁰ ₀	+23 ⁰ ₀	+23 ⁰ ₀	23 ⁰ ₀	-7 ⁰ ₀
IC 11	Research and development programs	68 ⁰ ₀	+5 ⁰ ₀	+15 ⁰ ₀	+2 ⁰ ₀	+8 ⁰ ₀
IC 12	The quality of products or services	33 ⁰ ₀	+35 ⁰ ₀	-48 ⁰ ₀	+8 ⁰ ₀	+8 ⁰ ₀
IC 13	The organization structure	30 ⁰ ₀	0 ⁰ ₀	+8 ⁰ ₀	+3 ⁰ ₀	+13 ⁰ ₀
IC 14	The technological know-how	35 ⁰ ₀	+25 ⁰ ₀	+50 ⁰ ₀	7 ⁰ ₀	+9 ⁰ ₀
IC 15	The time required to perform activities such as production, delivery of products, development of new products	8 ⁰ ₀	+5 ⁰ ₀	+15 ⁰ ₀	+3 ⁰ ₀	+5 ⁰ ₀
IC C	External structure					
IC 16	Evolution in the market share	38 ⁰ ₀	+15 ⁰ ₀	+18 ⁰ ₀	56 ⁰ ₀	-17 ⁰ ₀
IC 17	Main brands of the company	60 ⁰ ₀	+13 ⁰ ₀	+18 ⁰ ₀	-14 ⁰ ₀	+33 ⁰ ₀
IC 18	Customer satisfaction or customer loyalty	15 ⁰ ₀	+10 ⁰ ₀	+20 ⁰ ₀	+5 ⁰ ₀	-8 ⁰ ₀
IC 19	Realized acquisitions	58 ⁰ ₀	+18 ⁰ ₀	-18 ⁰ ₀	63 ⁰ ₀	+3 ⁰ ₀
IC 20	Distribution and delivery methods	68 ⁰ ₀	+5 ⁰ ₀	+5 ⁰ ₀	-5 ⁰ ₀	6 ⁰ ₀

For the multivariate analysis, the control variables included are the number of companies followed by the financial analyst (COM_i) and the years of experience of the financial analyst (EXP_i). The following model was estimated:

$$ACC_i = \beta_0 + \beta_1 COM_i + \beta_2 EXP_i + \beta_3 U_CAT_i + e_i$$

where:

ACC_i the mean forecast accuracy of the firms followed by financial analyst i ;

COM_i the number of companies followed by financial analyst i ;

EXP_i the years of experience of financial analyst i ;

U_CAT_i the use of non-financial information category CAT by financial analyst i .

e_i error term.

4. Research findings

4.1. Disclosure of voluntary non-financial information in annual reports

Table 2 (columns 2 to 4) shows the extent to which each of the 71 non-financial information items is mentioned in the annual reports. Column 2 provides the percentage of non-financial information items reported in the 2001 annual reports. Columns 3 and 4 compare the use of each information item in the 2003 and 2005 annual reports, respectively, in relationship to the 2001 annual reports. The research findings reveal that the items MAN.1 (the directors and executive management), BI.4 (the industry in which the business participates), and BI.6 (the principle markets and market segments), are disclosed in at least one annual report for each company. The results further show an increase in the reporting of intellectual capital information items such as the item IC.14 (technological know-how) increasing by 25% in 2003 and 50% in 2005 compared to 2001; and IC.12 (quality of the products or services), increasing by 35% in 2003 and 48% in 2005. In addition, the annual reports of 2003 and 2005 include more forward-looking information such as the item FWL.11 (future production capacity of the company) increasing by 18% in 2003 and 33% in 2005; FWL.2 (future opportunities of the company) increasing by 8% in 2003 and 33% in 2005; and FWL.1 (future risks of the company) increasing by 13% in 2003 and 55% in 2005. The latter result has to be interpreted with caution since Belgian companies were required, as of 2005, to disclose information about the risks of the company.

The descriptive statistics in Table 3 demonstrate that on average the 2001 annual report contains 40% of all non-financial information items. This percentage increases to 46% in 2003 and to 52% in 2005. These figures clearly highlight an increasing trend in the reporting of non-financial information over time. In particular, the enhanced reporting of the information categories IC.B (internal structure), FWL (forward-looking information), and IC.C (external structure) is noteworthy. Table 3 also shows that the information (sub) categories BI.A (broad objectives and strategy), MAN (information about management and shareholders), and BI.B (scope and description of business and properties) receive the most attention in the annual reports.

Table 3
Descriptive statistics of the disclosure of voluntary non-financial information in the annual reports 2001, 2003 and 2005 (N = 40)

Category	Annual reports 2001				Annual reports 2003				Annual reports 2005				Changes	
	Mean	Min	Max	Standard deviation	Mean	Min	Max	Standard deviation	Mean	Min	Max	Standard deviation	2003 v 2001	2005 v 2001
D TOF (71)*	40%	23%	65%	0.09	46%	14%	65%	0.10	52%	23%	69%	0.09	+6%	+12%
D ANA (11)	35%	18%	64%	0.11	39%	18%	73%	0.15	42%	18%	73%	0.15	+4%	+6%
D ANA A (6)	50%	17%	83%	0.18	55%	17%	83%	0.20	58%	17%	100%	0.22	+5%	+8%
D ANA B (5)	16%	0%	40%	0.13	20%	0%	60%	0.18	23%	0%	60%	0.16	+4%	+7%
D FWL (11)	31%	0%	73%	0.15	41%	0%	91%	0.18	52%	18%	91%	0.17	+10%	+21%
D MAN (6)	66%	33%	100%	0.16	70%	17%	100%	0.17	74%	33%	100%	0.14	+4%	+8%
D BI (23)	44%	17%	65%	0.11	46%	22%	65%	0.12	52%	26%	74%	0.10	+2%	+8%
D BI A (3)	72%	0%	100%	0.25	71%	0%	100%	0.22	81%	0%	100%	0.21	1%	+9%
D BI B (10)	60%	30%	100%	0.16	64%	40%	90%	0.14	69%	50%	90%	0.11	+4%	+9%
D BI C (10)	21%	0%	50%	0.14	22%	0%	60%	0.15	27%	0%	60%	0.14	+1%	+6%
D IC (20)	36%	5%	70%	0.13	45%	0%	65%	0.14	51%	5%	80%	0.15	+9%	+15%
D IC A (7)	25%	0%	57%	0.17	24%	0%	57%	0.19	31%	0%	86%	0.20	1%	+6%
D IC B (8)	38%	0%	88%	0.21	53%	0%	88%	0.20	62%	13%	100%	0.19	+15%	+24%
D IC C (5)	48%	0%	80%	0.21	60%	0%	100%	0.24	63%	0%	100%	0.25	+12%	+15%

Notes: D: CAT: the disclosure of non-financial information category; CAT: with CAT: TOF: "aggregate amount of non-financial information"; ANA: "management's analysis of financial and non-financial data"; ANA A: "reasons for changes in the financial, operating and performance related data"; ANA B: "the identity and past effect of key trends"; FWL: "forward looking information"; MAN: "information about management and shareholders"; BI: "background information"; BI A: "broad objectives and strategies"; BI B: "scope and description of business and properties"; BI C: "impact of industry structure on the company"; IC: "intellectual capital information"; IC A: "human capital"; IC B: "internal structure"; IC C: "external structure"; * between parentheses the number of information items belonging to each non-financial information category.

We apply the non-parametric, Friedman F -test to test the statistical significance of the increased disclosure of voluntary non-financial information. The research findings related to this test are presented in Table 4 and show that listed Belgian companies report a significantly varying amount of non-financial information (D_TOT) in at least one period. The increasing trend in the rank figures suggests that Hypothesis 1 is not rejected. It also appears that firms report significantly more non-financial information in at least one period for the information categories FWL (forward-looking information), BI (background information), IC (intellectual capital information), and all the sub-categories of BI and IC, except the category IC.A (human capital). The remaining information categories MAN (information about the management and shareholders) and ANA (management's analysis of financial and non-financial data) show a significant increase only at the 10% level.

Additionally, we use the Wilcoxon rank test for a pair-wise (between 2 years) research on the change in the disclosure of non-financial information. The results, in Table 5, show that the aggregate amount of non-financial information (D_TOT) increased significantly from 2001 to 2003 and from 2003 to 2005. In each pair-wise analysis, corporate managers disclose more information of the categories FWL (forward-looking information), and IC (intellectual capital information), especially the sub-category IC.B (internal structure). The 2005 annual reports contain significantly more non-financial information in every information category compared to the annual reports 2001. So these findings support Hypothesis 1.

4.2. The use of voluntary non-financial information by financial analysts

Column 5 of Table 2 shows how often each of the 71 information items are noted in the analyst reports of 2002. Columns 6 and 7 demonstrate the change in the amount of non-financial information mentioned in the analyst reports from 2002 to 2004 and from 2002 to 2006. Table 2 also shows that nearly every financial analyst mentions item BI.4 (the industry in which the business participates). The descriptive statistics further show that financial analysts discuss items BI.6 (the principal products and services); and BI.7 (the principal market and market segments), in more than 90% of their reports. Inconsistent with our assumptions, some information items are included in fewer analysts' reports over time, such as the items BI.2 (the broad strategies of the company) decreasing by 24% in 2004 and 12% in 2006; BI.3 (the (in)consistency of the strategy with the key trends affecting the business) decreasing by 23% in 2004 and 25% in 2006, and BI.1 (the broad objectives of the company) decreasing by 21% in 2004 and 1% in 2006. The decline in the frequency of information about objectives and strategy is remarkable since nearly all annual reports contain such information. Large decreases are also shown for item BI.9 (the seasonality and cyclicity of the company) decreasing by 40% in 2004 and 27% in 2006. Non-financial information items discussed in an increasing number of analyst reports include, for instance, the item FWL.7 (the comparison of actual business performance to previously disclosed opportunities, risks and plans of the company); IC.17 (the main brands of the company); and IC.9 (innovation).

Table 6 provides descriptive statistics of the use of non-financial information provided in the analyst reports over time. As Table 6 shows, the amount of voluntary non-financial information (U_TOT) included in analyst reports remains stable over the three periods. On

Table 4
Results of the non-parametric Friedman test on the disclosure of voluntary non-financial information in annual reports during three years ($N=40$)

Category	Year	Rank	Chi square	Significance level
D_TOT	2001	1.350	39.636	0.000
	2003	1.925		
	2005	2.725		
D_ANA	2001	1.750	4.864	0.088
	2003	2.100		
	2005	2.150		
D_ANA.A	2001	1.850	1.832	0.400
	2003	2.063		
	2005	2.088		
D_ANA.B	2001	1.850	2.939	0.230
	2003	2.000		
	2005	2.150		
D_FWL	2001	1.513	24.014	0.000
	2003	1.938		
	2005	2.550		
D_MAN	2001	1.800	5.691	0.058
	2003	1.963		
	2005	2.238		
D_BI	2001	1.675	12.556	0.002
	2003	1.900		
	2005	2.425		
D_BI.A	2001	1.888	6.343	0.042
	2003	1.850		
	2005	2.263		
D_BI.B	2001	1.713	11.824	0.003
	2003	1.913		
	2005	2.375		
D_BI.C	2001	1.813	6.016	0.049
	2003	1.913		
	2005	2.275		
D_IC	2001	1.463	23.700	0.000
	2003	2.063		
	2005	2.475		
D_IC.A	2001	1.913	2.492	0.288
	2003	1.913		
	2005	2.175		
D_IC.B	2001	1.463	24.111	0.000
	2003	2.125		
	2005	2.413		
D_IC.C	2001	1.613	12.738	0.002
	2003	2.100		
	2005	2.288		

Notes: D_CAT: the disclosure of non-financial information category CAT, with CAT = TOT “aggregate amount of non-financial information”, ANA “management’s analysis of financial and non-financial data”, ANA.A “reasons for changes in the financial, operating and performance related data”, ANA.B “the identity and past effect of key trends”, FWL “forward-looking information”, MAN “information about management and shareholders”, BI “background information”, BI.A “broad objectives and strategy”, BI.B “scope and description of business and properties”, BI.C “impact of industry structure on the company”, IC “intellectual capital information”, IC.A: “human capital”, IC.B: “internal structure”, IC.C: “external structure”.

Table 5

Results of the non-parametric Wilcoxon ranks test on the disclosure of voluntary non-financial information in annual reports during 2 years

Category	Comparison 2003–2001			Comparison 2005–2003			Comparison 2005–2001		
	Number AR	Mean rank	z-value	Number AR	Mean rank	z-value	Number AR	Mean rank	z-value
D_TOT	9	12.94	3.690***	6	14.92	-4.081***	3	12.00	-4.854***
	+ 29	21.53		32	20.36		35	20.14	
	= 2			2			2		
D_ANA	- 8	14.81	-1.727**	15	15.57	-0.857	10	9.60	-2.662***
	+ 19	13.66		18	18.19		19	17.84	
	= 13			7			11		
D_ANA.A	- 10	12.30	1.374*	14	13.54	0.625	11	11.09	-1.918**
	+ 16	14.25		15	16.37		17	16.71	
	= 14			11			12		
D_ANA.B	- 9	10.17	1.204	8	10.25	-0.927	8	10.94	-1.883**
	+ 13	12.42		12	10.67		16	13.28	
	= 18			20			16		
D_FWL	- 11	13.50	2.764***	8	15.75	-2.967***	5	10.90	4.406***
	+ 24	20.06		26	18.04		31	19.73	
	= 5			6			4		
D_MAN	- 10	9.70	-1.288*	11	13.27	-1.394*	6	10.50	-2.857***
	+ 13	13.77		17	15.29		19	13.79	
	= 17			12			15		
D_BI	- 14	18.04	1.530*	10	14.85	3.097***	10	9.60	3.883***
	+ 23	19.59		27	20.54		27	22.48	
	= 3			3			3		
D_BI.A	- 11	12.00	0.200	6	12.50	2.449***	8	12.00	1.980**
	+ 11	11.00		18	12.50		17	13.47	
	= 18			16			15		
D_BI.B	- 12	13.83	-1.401*	8	15.25	-2.122**	7	13.00	-3.138***
	+ 18	16.61		21	14.90		24	16.88	
	= 10			11			9		
D_BI.C	- 13	16.31	-0.432	9	12.44	2.378***	10	13.20	2.332***
	+ 17	14.88		20	16.15		21	17.33	
	= 10			11			9		
D_IC	- 7	10.43	3.732***	9	11.89	2.956***	6	9.25	4.371***
	+ 26	18.77		23	18.30		30	20.35	
	= 7			8			4		
D_IC.A	- 13	12.35	-0.323	12	9.67	-2.244**	10	14.00	-1.706**
	+ 11	12.68		17	18.76		19	15.53	
	= 16			11			11		
D_IC.B	- 5	6.50	-3.813***	11	10.45	2.284**	4	7.13	-4.635***
	+ 22	15.70		18	17.78		30	18.88	
	= 13			11			6		
D_IC.C	- 8	12.56	-2.593***	10	12.85	0.952	7	13.50	3.303***
	+ 21	15.93		15	13.10		25	17.34	
	= 11			15			8		

average, 33% to 35% of all the non-financial information items are discussed over time in each year (2002, 2004 and 2006). The frequency with which certain non-financial information categories are mentioned in the three periods evolves as well. For example, analysts provide less information for the categories BI.A (broad objectives and strategy) decreasing by 23% in 2004 and 12% in 2006; and BI.B (scope and description of business and properties) decreasing by 11% in 2004 and 7% in 2006. In contrast they mention more non-financial information for the information categories ANA.A (management's analysis of financial and non-financial data) increasing by 5% in 2004 and 9% in 2006; and IC.B, (internal structure) increasing by 2% in 2004 and 7% in 2006. The remaining categories demonstrate a limited evolution over time.

Table 6 shows further that the items in category BI are often discussed in the analyst reports, despite an overall decrease in mentioning this category in 2004 and 2006. Each analyst report discusses about one half of the information items belonging to this category. The category FWL appears to be important as well, with almost one half of the information items appearing in each analyst report. On the other hand, financial analysts only occasionally discuss the category IC although Table 6 shows a moderate increase in the number of times these items are mentioned in the analyst reports. The table also shows that only a low amount of human capital information (category IC.A) is provided in the analyst reports which drives our finding that intellectual capital information as a whole is only moderately used. We also show that the analyst reports contain a limited amount of information items belonging to the category MAN (around 21% in the three periods).

In order to compare the quantity of voluntary non-financial information mentioned in the analyst reports over time, only those analyst reports issued for the same company by the same financial analyst operating at the same brokerage firm in all periods, are included for further analysis resulting in 30 paired analyst reports. The average amount of voluntary non-financial information is somewhat larger in this paired sample compared to the full sample. This finding is consistent with the results of Flöstrand and Ström (2006). To examine the significance of the changes in the frequency with which non-financial information is included in analyst reports, we apply the Friedman test to the limited sample of 30 analyst reports. The research findings, in Table 7, do not show a significant difference in any one of the three periods analyzed, suggesting that Hypothesis 2 is not supported. The research results in Table 7 further reveal a significant difference in the amount of information mentioned for information category BI and its sub-categories BI.A and BI.B. As previously discussed, financial analysts mention a larger number of items in the 2002

Notes to Table 5:

D CAT: the disclosure of non-financial information category CAT, with CAT = TOT "aggregate amount of non-financial information", ANA: "management's analysis of financial and non-financial data", ANA.A: "reasons for changes in the financial, operating and performance related data", ANA.B: "the identity and past effect of key trends", FWL: "forward-looking information", MAN: "information about management and shareholders", BI: "background information", BI.A: "broad objectives and strategy", BI.B: "scope and description of business and properties", BI.C: "impact of industry structure on the company", IC: "intellectual capital information", IC.A: "human capital", IC.B: "internal structure", IC.C: "external structure", number AR: the number of annual reports showing a decrease (−), an increase (+) or no evolution (=) between the periods analyzed, ***significant at a 1% level, **significant at a 5% level, *significant at a 10% level.

Table 6
Descriptive statistics of the use of voluntary non-financial information in the analyst reports 2002, 2004 and 2006 (full sample $N = 52$ in 2002, $N = 63$ in 2004 and $N = 62$ in 2005)

Category	Analyst reports 2002				Analyst reports 2004				Analyst reports 2006				Changes	
	Mean	Min	Max	Standard deviation	Mean	Min	Max	Standard deviation	Mean	Min	Max	Standard deviation	2004 v 2002	2006 v 2002
U_TOT (71)*	35 ⁰	14 ⁰	52 ⁰	0.09	33 ⁰	15 ⁰	61 ⁰	0.10	35 ⁰	17 ⁰	54 ⁰	0.09	2 ⁰	0 ⁰
U_ANA (11)	30 ⁰	0 ⁰	45 ⁰	0.12	31 ⁰	0 ⁰	55 ⁰	0.12	33 ⁰	9 ⁰	55 ⁰	0.11	+1 ⁰	+3 ⁰
U_ANA A (6)	40 ⁰	0 ⁰	83 ⁰	0.18	45 ⁰	0 ⁰	83 ⁰	0.19	49 ⁰	17 ⁰	83 ⁰	0.16	+5 ⁰	+9 ⁰
U_ANA B (5)	17 ⁰	0 ⁰	60 ⁰	0.16	14 ⁰	0 ⁰	60 ⁰	0.15	13 ⁰	0 ⁰	60 ⁰	0.16	3 ⁰	4 ⁰
U_FWL (11)	48 ⁰	18 ⁰	82 ⁰	0.16	48 ⁰	18 ⁰	82 ⁰	0.15	51 ⁰	18 ⁰	82 ⁰	0.15	0 ⁰	+3 ⁰
U_MAN (6)	21 ⁰	0 ⁰	50 ⁰	0.16	23 ⁰	0 ⁰	50 ⁰	0.15	20 ⁰	0 ⁰	67 ⁰	0.16	+2 ⁰	-1 ⁰
U_BI (23)	50 ⁰	9 ⁰	74 ⁰	0.14	43 ⁰	13 ⁰	78 ⁰	0.14	45 ⁰	22 ⁰	78 ⁰	0.14	-7 ⁰	5 ⁰
U_BI A (3)	70 ⁰	0 ⁰	100 ⁰	0.28	47 ⁰	0 ⁰	100 ⁰	0.31	58 ⁰	0 ⁰	100 ⁰	0.27	23 ⁰	-12 ⁰
U_BI B (10)	65 ⁰	20 ⁰	100 ⁰	0.16	54 ⁰	20 ⁰	100 ⁰	0.16	58 ⁰	30 ⁰	100 ⁰	0.15	-11 ⁰	7 ⁰
U_BI C (10)	30 ⁰	0 ⁰	70 ⁰	0.17	30 ⁰	0 ⁰	70 ⁰	0.18	29 ⁰	0 ⁰	90 ⁰	0.19	0 ⁰	-1 ⁰
U_IC (20)	18 ⁰	0 ⁰	40 ⁰	0.10	19 ⁰	0 ⁰	55 ⁰	0.11	21 ⁰	0 ⁰	50 ⁰	0.10	+1 ⁰	+3 ⁰
U_IC A (7)	6 ⁰	0 ⁰	29 ⁰	0.09	6 ⁰	0 ⁰	43 ⁰	0.10	5 ⁰	0 ⁰	29 ⁰	0.08	0 ⁰	-1 ⁰
U_IC B (8)	16 ⁰	0 ⁰	63 ⁰	0.15	18 ⁰	0 ⁰	75 ⁰	0.17	23 ⁰	0 ⁰	63 ⁰	0.18	+2 ⁰	+7 ⁰
U_IC C (5)	36 ⁰	0 ⁰	80 ⁰	0.22	30 ⁰	0 ⁰	80 ⁰	0.24	40 ⁰	0 ⁰	100 ⁰	0.24	+3 ⁰	+4 ⁰

Notes: U_CAT: the use of non-financial information category CAT, with CAT = TOT "aggregate amount of non-financial information"; ANA "management's analysis of financial and non-financial data"; ANA A "reasons for changes in the financial, operating and performance related data"; ANA B "the identity and past effect of key trends"; FWL "forward-looking information"; MAN "information about management and shareholders"; BI: "background information"; BI A: "broad objectives and strategy"; BI B "scope and description of business and properties"; BI C "impact of industry structure on the company"; IC "intellectual capital information"; IC A "human capital"; IC B "internal structure"; IC C "external structure". * between parentheses the number of information items belonging to each non-financial information category

Table 7

Results of the non-parametric Friedman test on the use of voluntary non-financial information in analyst reports during three years ($N = 30$)

Category	Year	Rank	Chi square	Significance level
U_TOT	2002	2.217	3.774	0.152
	2004	1.733		
	2006	2.050		
U_ANA	2002	1.983	0.064	0.969
	2004	1.983		
	2006	2.033		
U_ANA.A	2002	1.850	2.116	0.347
	2004	2.167		
	2006	1.983		
U_ANA.B	2002	2.117	1.000	0.607
	2004	1.917		
	2006	1.967		
U_FWL	2002	1.917	7.458	0.024
	2004	1.717		
	2006	2.367		
U_MAN	2002	2.033	0.644	0.725
	2004	2.067		
	2006	1.900		
U_BI	2002	2.483	12.056	0.002
	2004	1.683		
	2006	1.833		
U_BI.A	2002	2.317	6.473	0.039
	2004	1.750		
	2006	1.933		
U_BI.B	2002	2.483	14.168	0.001
	2004	1.650		
	2006	1.867		
U_BI.C	2002	2.200	2.154	0.341
	2004	1.867		
	2006	1.933		
U_IC	2002	1.883	1.691	0.429
	2004	1.933		
	2006	2.183		
U_IC.A	2002	2.083	3.085	0.214
	2004	2.100		
	2006	1.817		
U_IC.B	2002	1.883	3.449	0.178
	2004	1.867		
	2006	2.250		
U_IC.C	2002	1.900	1.089	0.580
	2004	2.117		
	2006	1.983		

Notes: U_CAT: the use of non-financial information category CAT, with CAT = TOT “aggregate amount of non-financial information”, ANA “management’s analysis of financial and non-financial data”, ANA.A “reasons for changes in the financial, operating and performance related data”, ANA.B “the identity and past effect of key trends”, FWL “forward-looking information”, MAN “information about management and shareholders”, BI “background information”, BI.A “broad objectives and strategy”, BI.B “scope and description of business and properties”, BI.C “impact of industry structure on the company”, IC “intellectual capital information”; IC.A: “human capital”; IC.B: “internal structure”; IC.C: “external structure”

Table 8

Results of the non-parametric Wilcoxon rank test on the use of voluntary non-financial information in analyst reports during 2 years

Category	Comparison 2004–2002			Comparison 2006–2004			Comparison 2006–2004		
	Number AR	Mean rank	z-value	Number AR	Mean rank	z-value	Number AR	Mean rank	z-value
U_TOT	24	18.04	-1.934**	20	19.88	-0.676	15	16.63	-0.029
	+ 11	17.91		22	22.98		16	15.41	
	- 0			2			3		
U_ANA	- 12	12.67	-0.613	18	16.28	-0.080	11	12.32	-0.740
	+ 14	14.21		16	18.88		14	13.54	
	= 9			10			9		
U_ANA_A	- 8	11.81	-1.369*	19	14.26	-0.176	8	10.06	-1.528*
	+ 15	12.10		14	20.71		14	12.32	
	= 12			11			12		
U_ANA_B	- 11	10.59	-0.920	12	11.88	-0.144	14	10.14	-0.520
	+ 8	9.19		11	12.14		8	13.88	
	= 16			21			12		
U_FWL	- 18	15.44	-0.948	15	20.60	1.604**	8	15.31	-1.093
	+ 12	15.58		26	21.23		17	11.91	
	= 5			3			9		
U_MAN	- 12	11.17	0.126	20	14.20	1.121	14	14.54	-0.747
	+ 11	12.91		10	18.10		12	12.29	
	= 12			14			8		
U_BI	- 26	16.81	-3.248***	18	19.75	-0.483	21	14.43	-2.287**
	+ 6	15.17		21	20.21		7	14.71	
	= 3			5			6		
U_BI_A	- 19	13.00	-2.877***	12	15.21	1.582*	18	15.11	-1.687**
	+ 5	10.60		20	17.28		10	13.40	
	= 11			12			6		
U_BI_B	- 24	14.60	-3.404***	12	13.79	0.869*	20	13.68	-2.060**
	+ 4	13.88		16	15.03		7	14.93	
	= 7			16			7		
U_BI_C	- 18	15.00	1.541*	19	16.95	-0.755	17	15.41	-0.973
	+ 10	13.60		14	17.07		12	14.42	
	= 7			11			5		
U_IC	- 15	16.77	0.069	19	18.71	-0.742	11	15.45	-1.043
	+ 16	15.28		21	22.12		18	14.72	
	= 4			4			5		
U_IC_A	- 8	8.50	0.000	14	10.93	-1.966**	8	5.00	-1.387*
	+ 8	8.50		6	9.50		2	7.50	
	= 19			24			24		
U_IC_B	- 14	16.14	0.910	11	12.91	1.889**	9	11.50	1.866**
	+ 13	11.69		19	17.00		17	14.56	
	= 8			14			8		
U_IC_C	- 7	13.57	0.735	15	15.20	0.240	11	9.82	0.269
	+ 14	9.71		14	14.79		10	12.30	
	= 14			15			13		

analyst reports compared to the analyst reports for the remaining periods. A significant increase in the information category FWL is noted in analyst reports issued in 2006.

We also perform a pair-wise analysis of the various two-year periods in order to observe possible changes. The Wilcoxon rank test is applied to a limited number of analyst reports selected by the same criteria as discussed above. This limitation results in a sample size of 35 paired cases between 2002 and 2004, 44 cases between 2004 and 2006 and 34 cases between 2002 and 2006. The results, in Table 8, show that the total amount of non-financial information in analyst reports significantly declines between the period 2002 and 2004. This decrease is especially noticeable in the information categories BI and the sub-categories BI.A and BI.B. The 2006 analyst reports show an increase in these information categories compared to the 2004 analyst reports. We also note a lower amount of human capital information in the 2006 analyst reports compared to the 2004 analyst reports. A significant increase in the reporting of forward-looking information in the period 2006 compared to the previous periods is consistent with the hypothesis. In addition, the 2006 analyst reports contain a larger number of items from category IC.B (internal structure).

Although two information categories show a significant increase in use in the analyst reports, the general trend is that financial analysts do not include much more non-financial information items in their reports over time. Therefore, with the exception of the information categories FWL and IC.B, our results do not support Hypothesis 2.

4.3. *The comparison between corporate managers and financial analysts*

Comparing Tables 3 and 5, shows that annual reports include more non-financial information than analyst reports, a consistent finding of García-Meca (2005). This finding, however, is expected because companies have to respond to multiple stakeholders (Bowen, DuCharme, & Shores, 1995; Moneva and Llena, 2000). Firms also report some information in order to enhance stock prices and/or to reduce the cost of capital (García-Meca, 2005). Rogers and Grant (1997) further mention that financial analysts do not mention all available information in their analyst reports. In particular, they tend to avoid including information they consider less reliable (e.g., human capital information).

By examining the mean scores for each information category separately (Tables 3 and 5), we see that analyst reports issued in 2002 discuss more information of the non-financial information (sub)categories ANA.B, FWL, BI, and its sub-categories BI.B and BI.C. Annual

Notes to Table 8:

U: CAT: the use of non-financial information category CAT, with CAT = TOT: "aggregate amount of non-financial information"; ANA: "management's analysis of financial and non-financial data"; ANA.A: "reasons for changes in the financial, operating and performance related data"; ANA.B: "the identity and past effect of key trends"; FWL: "forward-looking information"; MAN: "information about management and shareholders"; BI: "background information"; BI.A: "broad objectives and strategy"; BI.B: "scope and description of business and properties"; BI.C: "impact of industry structure on the company"; IC: "intellectual capital information"; IC.A: "human capital"; IC.B: "internal structure"; IC.C: "external structure"; number AR: the number of analyst reports showing a decrease (−), an increase (+) or no evolution (=) between the periods analyzed; ***significant at a 1% level; **significant at a 5% level; *significant at a 10% level.

reports of 2003 contain more information in the remaining non-financial information categories. When comparing the content of annual reports of 2003 with analyst reports issued in 2004, we see that financial analysts only include more information for the non-financial information categories FWL and BLC in their reports. The 2006 analyst reports mention more information only for the category BLC.

The Mann-Whitney U test comparing the amount of non-financial information presented in annual reports and analyst reports confirm our descriptive findings. So, Table 9 documents a significant difference (10%) in 2002 with respect to the aggregate disclosure and use of voluntary non-financial information, suggesting that corporate managers are disclosing a little more voluntary non-financial information in their reports. However, analyst reports provide significantly more information for the categories FWL, BI, and the sub-categories BI B and BI C. Annual reports, on the other hand, discuss significantly more information for the categories ANA, ANA 4, MAN, IC, and each of the IC sub-categories. The statistical results show no significant difference in the disclosure and usage of the information sub-categories ANA B and BI A.

For the period 2005, Table 9 demonstrates that corporate managers also increased reporting in categories FWL and BLC, since investors can find the same amount of this information in annual reports as in analyst reports. With regard to the remaining information categories, Table 4 shows that the 2005 annual reports contain significantly more non-financial information than the 2006 analyst reports.

Our research confirms our expectations. Consistent with Hypothesis 3, companies have improved their reporting in those categories that financial analysts were using more often in 2002, i.e., the information categories FWL, BI, BI B, and BLC.

4.4. The use of voluntary non-financial information and the inclusion of forecasts

In the second stage, a questionnaire, which included the same non-financial information items as the disclosure index applied in the content-analysis method, was sent to the same population of financial analysts. The extent to which each of the 31 respondents relies on voluntary non-financial information for each information category and a summary of statistics about control variables are presented in Table 10.⁷ On average, our respondents follow 3 companies (ranging from two to 15 companies). The respondents reported having about 7.5 years of experience.

The scores regarding the use of non-financial information range from zero (never used) to four (always used). The average score for our research analysts is 2.40, indicating that they "sometimes to often" rely on voluntary non-financial information. Table 10 also shows some differences in use, depending on the non-financial information category. Financial analysts are most concerned with items in the sub-category BI A (broad objectives and strategies). The average score of 3.20 denotes that analysts "often to always" use the items in this information category. The category FWL (forward-looking information) is the second most important information category, with an averaged value of 2.99 which shows that financial analysts "often" rely on forward-looking information. Our research also shows

⁷ For more details, see the full individual information that has been used from the survey.

Table 9

Results of the Mann-Whitney U-test on the distribution of the use of the disclosure categories across country and financial information.

Category		Spain		France		Italy	
		Median rank	z-statistic	Median rank	z-statistic	Median rank	z-statistic
DU_TOT	Annual reports	47.70	−0.29*	70.29	−3.24***	72.05	−4.70***
	Analyst reports	47.20		67.50		72.05	
DU_ANA	Annual reports	40.50	−0.74**	54.00	−1.74***	49.00	−1.40***
	Analyst reports	37.70		49.25		49.00	
DU_ANA_A	Annual reports	49.00	−1.24***	57.50	−1.24***	59.50	−1.24***
	Analyst reports	40.75		49.25		49.00	
DU_ANA_B	Annual reports	40.50	−0.20†	54.00	−1.24***	47.50	−1.40***
	Analyst reports	41.48		49.00		47.00	
DU_FWI	Annual reports	25.00	−1.40***	42.00	−1.80**	50.00	−0.20
	Analyst reports	40.50		52.75		49.75	
DU_MAN	Annual reports	65.70	−7.17***	70.00	−6.00***	70.20	−7.00***
	Analyst reports	57.00		52.29		70.00	
DU_BI	Annual reports	33.29	−1.22***	55.00	−3.00*	49.00	−1.40***
	Analyst reports	45.50		49.00		47.00	
DU_BI.A	Annual reports	41.50	−0.112	62.50	−3.70***	62.50	−4.17***
	Analyst reports	40.50		41.70		49.00	
DU_BI.B	Annual reports	34.50	−1.80**	61.01	−3.57***	62.70	−3.47***
	Analyst reports	44.45		47.50		49.00	
DU_BI.C	Annual reports	30.00	−1.03***	40.00	−1.34***	47.00	−0.20
	Analyst reports	40.00		50.00		49.00	
DU_IC	Annual reports	50.50	−2.00***	72.70	−3.50***	73.00	−7.00***
	Analyst reports	50.50		54.00		73.00	
DU_IC.A	Annual reports	55.72	−2.54***	67.00	−5.00***	70.20	−4.00***
	Analyst reports	52.70		50.27		49.00	
DU_IC.B	Annual reports	54.80	−4.00***	73.50	−4.00***	72.20	−4.00***
	Analyst reports	55.50		54.75		50.00	
DU_IC.C	Annual reports	48.55	−1.22***	63.50	−3.70***	65.20	−2.50***
	Analyst reports	49.70		47.20		50.00	

Notes: DU_TOT: the disclosure use of non-financial information category (0% (min) DU = 0.00) – aggregate amount of non-financial information; ANA: management's analysis of financial and non-financial data; ANA_A: reasons for changes in the financial, operating and performance related data; ANA_B: the causes and the effect of key trends; FWI: forward-looking information; MAN: information about management and shareholders; BI: background information; BI.A: broad business and strategy; BI.B: scope and description of business and properties; BI.C: impact of industry structure on the company; IC: human capital; IC.A: human capital; IC.B: internal structure; IC.C: external structure. ***Significant at 0.01 level; **Significant at 0.05 level; *Significant at 0.10 level.

that financial analysts use the information categories ANA_A (reasons for changes in the financial, operating and performance related data), BI_B (scope and description of business and properties) and BI_C (impact of industry structure on the company) to a large degree.

Conversely, we find that financial analysts rarely use information from the category IC_A (human capital). An average score of 1.39 indicates that the items in this information category are “rarely to sometimes” used, but they occasionally use the information category MAN (information about management and shareholders) which has an average score of 1.91.

Table 10

Descriptive statistics of the dependent and independent variables based on the survey method

Variables	Mean	Min	Max	SD
ACC _{<i>i</i>}	0.61	0.06	3.91	0.88
COM _{<i>i</i>}	8.23	2	15	3.73
EXP _{<i>i</i>}	7.45	1	26	4.88
U_CAT	2.46	1.06	3.77	0.56
U_ANA _{<i>i</i>}	2.39	1.27	3.64	0.61
U_ANA.A _{<i>i</i>}	2.82	1.50	4.00	0.69
U_ANA.B _{<i>i</i>}	1.87	0.60	3.20	0.68
U_FWL _{<i>i</i>}	2.99	1.55	4.00	0.66
U_MAN	1.91	0.17	4.00	0.90
U_BI	2.88	0.60	4.40	0.88
U_BI.A _{<i>i</i>}	3.23	1.00	4.00	0.83
U_BI.B _{<i>i</i>}	2.76	1.00	4.00	0.83
U_BI.C _{<i>i</i>}	2.76	1.20	4.00	0.71
U_IC _{<i>i</i>}	1.91	0.65	3.45	0.52
U_IC.A _{<i>i</i>}	1.39	0.29	3.71	0.60
U_IC.B _{<i>i</i>}	2.04	0.50	3.25	0.61
U_IC.C _{<i>i</i>}	2.45	1.40	3.80	0.60

Notes: This table provides the descriptive statistics for the variables: ACC = the mean forecast accuracy (measured as the absolute difference between the forecasted and the actual FPS scaled by the actual FPS) of the companies followed by financial analyst *i*; COM = the number of companies followed by financial analyst *i*; EXP = the years of experience of financial analyst *i*; U_CAT = the use of non-financial information category CAT by financial analyst *i*, with CAT = TOT “aggregate amount of non-financial information”; ANA = “management’s analysis of financial and non-financial data”; ANA.A = “reasons for changes in the financial, operating and performance related data”; ANA.B = “the identity and past effect of key trends”; FWL = “forward-looking information”; MAN = “Information about management and shareholders”; BI = “background information”; BI.A = “broad objectives and strategy”; BI.B = “scope and description of business and properties”; BI.C = “Impact of industry structure on the company”; IC = “intellectual capital information”; IC.A = “human capital”; IC.B = “internal structure”; IC.C = “external structure”; U_CAT_{*i*} is measured based on a Likert scale ranged as follows: zero = never used; one = rarely used; two = sometimes used; three = often used; four = always used

The survey results are comparable to the content analysis of the analyst reports.⁷ In both analyses the categories ANA.A, FWL, BI.A, and BI.B are seen as most important, while the categories ANA.B, MAN, and IC.A are seen as least important. The two research methods show differences however. For instance, the item IC.18 (customer satisfaction) is almost “never” discussed in the analyst reports, whereas the survey results document that financial analysts “sometimes” use this item. This finding illustrates that financial analysts do employ some non-financial information items, even when they do not discuss them in their reports.

To determine whether or not forecast accuracy is influenced by the use of non-financial information, we perform univariate correlation analyses on the data we collect by the survey

The comparison between the content of analyst reports and the survey results is first conducted on a limited sample that only contains the respondents to the questionnaire for whom analyst reports are analyzed. The sample consists of 15 respondents of the survey and 40 analyst reports. Second, the results of the 31 respondents to the survey and the content analysis of the 62 analyst reports are compared with each other as well. The research findings of both analyses: the comparison conducted on the full sample and on the limited sample, are similar, indicating that no biases exist which can be attributed to the difference in the samples.

method. These results in Table 11 demonstrate an insignificant correlation coefficient between the aggregate use of more non-financial information and accurate forecasts. Thus, Hypothesis 4 is not supported. Although the use of various non-financial information categories is positively related to the analysts' forecast accuracy, this association is only significant with respect to the categories FWL (forward-looking information) and IC.B (internal structure). For all the remaining information categories, Hypothesis 4 is not supported.

We also note that financial analysts who follow more companies forecast less accurately than those with fewer companies, which is consistent with earlier studies (Jacob et al., 1999; Clement & Tse, 2003). Furthermore, as in Jacob et al. (1999), length of experience does not influence the analysts' forecast accuracy.

We also estimate a regression model with the dependent variable being the ranking of raw data. The results, presented in Table 12, confirm the univariate research statistics in Table 11: analysts assessing fewer companies perform better, and analysts with more years of experience do not necessarily make more accurate forecasts. Our multivariate regression results show,

Table 11

Univariate correlation statistics between the analysts' forecast accuracy and the analyst-specific characteristics based on the survey method

	Pearson correlation			Spearman's rho correlation		
	ACC _{<i>i</i>}	COM _{<i>i</i>}	EXP _{<i>i</i>}	ACC _{<i>i</i>}	COM _{<i>i</i>}	EXP _{<i>i</i>}
ACC _{<i>i</i>}	1.000	0.473***	0.175	1.000	0.328*	0.164
COM _{<i>i</i>}	0.473***	1.000	0.226	0.328*	1.000	0.327*
EXP _{<i>i</i>}	0.175	0.226	1.000	0.164	0.327*	1.000
U_CAT _{<i>i</i>}	-0.146	0.234	0.042	0.142	0.262	-0.057
U_ANA _{<i>i</i>}	-0.096	0.119	0.080	-0.077	0.101	-0.059
U_ANA.A _{<i>i</i>}	0.129	0.146	0.142	-0.037	0.177	0.058
U_ANA.B _{<i>i</i>}	0.032	0.053	0.022	-0.044	0.059	-0.154
U_FWL _{<i>i</i>}	-0.393**	0.108	-0.108	-0.392**	0.191	-0.265
U_MAN _{<i>i</i>}	0.189	0.398**	0.019	0.097	0.317*	0.004
U_BI _{<i>i</i>}	-0.128	0.240	0.061	0.190	0.213	0.020
U_BI.A _{<i>i</i>}	-0.069	0.296	0.068	-0.133	0.295	-0.009
U_BI.B _{<i>i</i>}	0.009	0.322*	0.099	-0.154	0.294	-0.025
U_BI.C _{<i>i</i>}	0.236	0.087	0.014	-0.181	0.214	0.017
U_IC _{<i>i</i>}	-0.141	0.174	0.033	0.037	0.069	-0.073
U_IC.A _{<i>i</i>}	-0.024	0.148	0.060	0.151	0.039	0.002
U_IC.B _{<i>i</i>}	-0.332**	0.180	0.063	-0.318**	0.137	-0.044
U_IC.C _{<i>i</i>}	-0.097	0.130	-0.027	-0.131	0.123	-0.107

Notes: This table provides the Pearson correlations and the Spearman's rho correlations for the variables ACC_{*i*} – the mean forecast accuracy (measured as the absolute difference between the forecasted and the actual EPS scaled by the actual EPS) of the companies followed by financial analyst *i*; COM_{*i*} – the number of companies followed by financial analyst *i*; EXP_{*i*} – the years of experience of financial analyst *i*; U_CAT_{*i*} – the use of non-financial information category CAT by financial analyst *i*, with CAT = TOT "aggregate amount of non-financial information", ANA "management's analysis of financial and non-financial data", ANA.A "reasons for changes in the financial, operating and performance related data", ANA.B "the identity and past effect of key trends", FWL "forward-looking information", MAN "information about management and shareholders", BI "background information", BI.A "broad objectives and strategy", BI.B "scope and description of business and properties", BI.C "impact of industry structure on the company", IC "intellectual capital information", IC.A "human capital", IC.B "internal structure", IC.C "external structure"; ***significant at a 1% level; **significant at a 5% level; *significant at a 10% level.

Table 12
Multivariate regression statistics between the analysts' forecast accuracy and the analyst-specific characteristics based on the survey method

Variables	Beta coefficient	t-value	Significance level variable	F-value model	p-value model	R ²
Intercept	0.702	1.145	0.262	3.820	0.021**	29.8
COM _i	0.115	3.063	0.005***			
EXP _i	0.012	0.415	0.682			
U_TOT _i	-0.394	-1.631	0.114	3.052	0.046**	25.3
Intercept	0.319	0.531	0.600			
COM _i	0.105	2.760	0.010***			
EXP _i	0.013	0.470	0.642	3.388	0.032**	27.3
U_ANA _i	0.215	-0.940	0.356			
Intercept	0.519	0.845	0.406			
COM _i	0.107	2.851	0.008***	2.715	0.065*	23.2
EXP _i	0.016	0.554	0.584			
U_ANA_A _i	-0.266	-1.289	0.208			
Intercept	-0.038	-0.077	0.939	5.270	0.005***	36.9
COM _i	0.102	2.654	0.013**			
EXP _i	0.012	0.402	0.691			
U_ANA_B _i	-0.065	-0.322	0.750	2.671	0.068*	22.9
Intercept	1.000	1.793	0.084			
COM _i	0.118	3.332	0.003***			
EXP _i	0.009	0.33	0.742	3.709	0.024**	29.2
U_FWI _i	-0.434	-2.453	0.021**			
Intercept	-0.165	-0.415	0.681			
COM _i	0.100	2.394	0.024**	3.444	0.031**	27.7
EXP _i	0.012	0.414	0.682			
U_MAN _i	0.006	0.038	0.970			
Intercept	0.653	1.070	0.294	3.035	0.046**	25.2
COM _i	0.115	0.005	0.005***			
EXP _i	0.012	0.442	0.662			
U_BI _i	-0.328	-1.550	0.133	3.444	0.031**	27.7
Intercept	0.518	0.868	0.393			
COM _i	0.116	2.990	0.006***			
EXP _i	0.012	0.428	0.672	3.968	0.018**	30.6
U_BI_A _i	-0.241	-1.338	0.192			
Intercept	0.290	0.497	0.623			
COM _i	0.112	2.828	0.009***	3.500	0.029**	28.0
EXP _i	0.013	0.444	0.661			
U_BI_B _i	-0.192	-0.919	0.366			
Intercept	0.582	1.102	0.280	2.814	0.058*	23.8
COM _i	0.106	2.916	0.007***			
EXP _i	0.012	0.425	0.674			
U_BI_C _i	-0.294	-1.733	0.094*	2.814	0.058*	23.8
Intercept	0.436	0.818	0.421			
COM _i	0.110	2.923	0.007***			
EXP _i	0.012	0.417	0.680	2.814	0.058*	23.8
U_IC _i	-0.344	-1.386	0.177			
Intercept	0.001	0.001	1.000			
COM _i	0.104	2.704	0.012***	2.814	0.058*	23.8
EXP _i	0.012	0.430	0.670			
U_IC_A _i	0.132	0.576	0.569			

Table 12 (continued)

Variables	Bêta coefficient	t-value	Significance level variable	F-value model	p-value model	R
Intercept	0.619	1.276	0.213	4.509	0.011**	33.4
COM _{<i>i</i>}	0.114	3.144	0.004***			
EXP _{<i>i</i>}	0.013	0.493	0.626			
U_IC.B _{<i>i</i>}	−0.434	2.063	0.049**			
Intercept	0.321	0.532	0.599	3.050	0.046**	25.3
COM _{<i>i</i>}	0.106	2.782	0.010***			
EXP _{<i>i</i>}	0.010	0.364	0.719			
U_IC.C _{<i>i</i>}	−0.205	0.937	0.357			

Notes: This table includes the regression results of the following model:

$$ACC_i = \beta_0 + \beta_1 COM_i + \beta_2 EXP_i + \beta_3 U_ICAT_i + e_i$$

where ACC_{*i*} = the mean forecast accuracy (measured as the absolute difference between the forecasted and the actual EPS scaled by the actual EPS) of the companies followed by financial analyst *i*; COM_{*i*} = the number of companies followed by financial analyst *i*; EXP_{*i*} = the years of experience of financial analyst *i*; U_ICAT_{*i*} = the usage of the non-financial information category CAT by financial analyst *i*, with CAT = TOT – aggregate amount of non-financial information; ANA = management's analysis of financial and non-financial data; ANA.A = "reasons for changes in the financial, operating and performance related data"; ANA.B = "the identity and past effect of key trends"; FWL = "forward-looking information"; MAN = "information about management and shareholders"; BI = "background information"; BIA = "broad objectives and strategy"; BIB = "scope and description of business and properties"; BIC = "impact of industry structure on the company"; IC = "intellectual capital information"; IC.A = "human capital"; IC.B = "internal structure"; IC.C = "external structure"; *** significant at a 1% level; ** significant at a 5% level; * significant at a 10% level; *e_i*: error term.

consistent with the univariate statistics, a positive, significant relationship between the use of the non-financial information categories FWL and IC.B and the analysts' forecast accuracy, as well as a significant positive association (on a 10% level) between the use of the information category BIC (impact of industry structure on the company) and the analysts' forecast accuracy. Hypothesis 4 is, therefore, supported regarding the information categories FWL, IC.B, and BIC; it is not supported for the remaining information categories.

5. Discussion and topics for further research

This study examines the relevance of non-financial information to the Belgian capital market. Prior studies document that non-financial information is given greater weight in judging the value of a company. And, capital-market participants are requiring firms to voluntarily disclose more non-financial information.

Our empirical results suggest that companies have disclosed more non-financial information over time in response to the demands of regulatory bodies, financial analysts, and other capital-market participants for these disclosures. These findings correspond to the research results of earlier studies (e.g., Marston & Polei, 2004; Vandemaele et al., 2005). Despite this increase, financial analysts tend not to use the additional voluntary non-financial information except in two categories: forward-looking information and the internal structure of the company. Our findings further document that the increase in the disclosure of voluntary non-financial information has narrowed the gap between the information financial analysts require and the information provided by corporate managers.

We evaluated the use of non-financial information by examining the content of financial analysts' reports as compared to annual reports. This analysis is supplemented by a survey questionnaire. In general, the information use statistics found by the content-analysis method and the survey method differ very little. However, based on the survey results, we note that the use of forward-looking information and internal-structure information is positively related to the analysts' forecast accuracy. This is in contrast to the content analysis of analyst reports which shows no significant relationship.

An interesting topic for further research would be to examine whether information used by financial analysts, but which does not appear in their reports, has an influence on forecast accuracy. The results of this study should encourage listed companies to continue to enhance their disclosure strategy.

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Trends in research on international accounting harmonization

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Abstract

International harmonization of financial accounting standards has been the goal of many professional and academic accountants during the last 40 years. As of January 1, 2005, international accounting harmonization entered a new and perhaps decisive phase. From that date, all companies domiciled in the European Union with shares listed on securities exchanges are required to prepare their consolidated accounts in accordance with International Financial Reporting Standards (IFRS). This landmark event presents an opportunity for accounting researchers to assess the status of research on international accounting harmonization. In this paper, we review articles published in major English language accounting journals during the period from 1965 through 2004 in order to trace thematic and methodological trends in this line of research and to assess where the research may evolve from here. © 2007 University of Illinois. All rights reserved.

Keywords: Accounting research; International accounting harmonization; International accounting research; Financial accounting standards

1. Introduction

International harmonization of financial accounting standards has been the goal of many professional and academic accountant for many years, but progress has been slow in achieving this goal. There have been impediments to the creation of a uniform set of accounting standards for financial reporting purposes on a worldwide basis, not the least of

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which have been cultural, economic, and legal differences among countries. However, the process of international accounting harmonization has now entered a new phase. From January 1, 2005, all companies domiciled in the European Union with shares listed on securities exchanges must prepare their consolidated accounts in accordance with International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB). This event presents an opportunity for accounting researchers to analyze trends in research on international accounting harmonization and to assess where this research may proceed from here.

In this review article we identify over 200 research articles published between 1965 and 2004 that deal with international accounting harmonization. We also identify trends in this line of research, some of which grew or were reduced in importance during the 40 year period examined. In general the volume and level of rigor of the research increased, thus providing evidence of the importance of this line of subject to the accounting research community. The remainder of this paper proceeds as follows. In Section 2 we situate international accounting harmonization research within the larger field of international accounting research, and within the discipline of accounting generally, and we discuss the significance of this line of research. In Section 3, we present the methodology used to undertake this review. In Section 4 we identify and discuss trends in research on international accounting harmonization, noting how these trends have grown or were modified during the period examined. Section 5 summarizes and concludes the paper.

2. Situating IAH research

The accounting discipline can be divided into a number of sub-disciplines, including: financial, managerial, auditing, tax, and governmental accounting. Each sub-discipline follows certain research methodologies and targets a relatively small number of journals as the primary outlets for its efforts. In contrast, International Accounting Research (IAR) can involve any of the sub-disciplines of accounting, provided there is an international connection (Prather-Kinsey & Rueschhoff, 2004). Wallace and Meek (2002) define IAR as being concerned with:

accounting phenomena in one country with lessons or repercussions extending to other countries...accounting phenomena related to multinational enterprises...global movements to shape the direction of accounting...and comparative accounting requirements and practices.

While IAR has been recognized as a sub-discipline of accounting research for many years,² Falk (1994) argued that most IAR lacked rigor and an adequate theoretical underpinning. In recent years, however, there has been an increase in the volume of IAR (see Prather-Kinsey & Rueschhoff, 2004), and there has also been an increase in the rigor and level of theory used in undertaking IAR (see for example, Meek & Thomas, 2004). As part of IAR, international accounting harmonization research has contributed to the increase in volume and rigor of IAR.

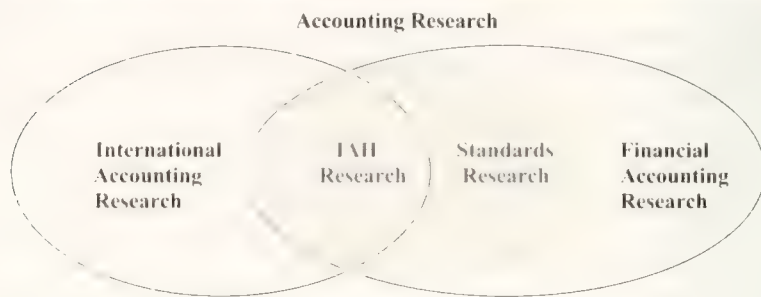


Fig. 1. Situating IAH research within accounting research.

While the subject matter of IAR might involve any of the sub-disciplines of accounting, this review article focuses on research dealing with the international harmonization of financial accounting standards (hereafter IAH). IAH research investigates the arguments for, efforts made towards, and trends in the direction of achieving international harmonization of financial accounting standards. IAH research is a subset of IAR, and it is also a subset of financial accounting research within the overall discipline of accounting. See Fig. 1 for a diagram which graphically situates IAH research within the accounting discipline.

2.1. The importance of IAH research

As with many topics in accounting research, practicing accountants may develop an interest in the topic prior to academic accountants. There was little interest in IAH research on the part of the academic community prior to 1965. Most of the early articles dealing with IAH were written by practicing accountants, and they were published in professional journals, such as the *Journal of Accountancy*³ (see for example: Brandt, 1962; Englemann, 1962; Enthoven, 1965; Jennings, 1962). For example, the objective of Brandt's (1962) article in the *Journal of Accountancy* was to examine "differences in accounting principles and practices in European countries, with a suggested approach to worldwide uniformity" (p. 68). The goal of achieving worldwide uniformity of financial accounting standards continued to be important for practicing accountants throughout the intervening period (see for example: Cairns, 1989; Carey, 1990; Fisher, 1990; Lmowes, 1969; Wilson, 1991; Van Hulle, 1989a,b; Wyatt & Yospe, 1993).

The creation of the International Accounting Standards Committee (IASC) in 1973, appears to have prompted an increased interest in IAH research. Wyatt (1989) noted that one of the primary reasons for the creation of the IASC was to advance the international harmonization of financial accounting standards. In response, accounting researchers began to investigate the feasibility of achieving international harmonization and also to investigate the reasons behind the observed diversity of accounting practices. Between 1973 and 1989, progress was slow towards achieving the goal of international harmonization. In a move to

speed up this process the IASC issued a *Framework for the Preparation and Presentation of Financial Statements* in 1989 which set forth the basic concepts underlying international accounting standards (IAS). The purpose of this framework was to promote greater international harmonization by reducing the number of alternative accounting treatments permitted. However, once again, progress was slow towards reaching the goal of international harmonization. In 1995, an agreement was reached between the IASC and the International Organization of Securities Commissions (IOSCO) whereby IASC agreed to develop a core set of accounting standards, and IOSCO in turn agreed to recommend that these standards be allowed for use in global capital markets (IASC, 1995). This agreement between the IASC and IOSCO signaled that one of the primary reasons for international harmonization was to facilitate the operations of worldwide capital markets. This recognition led to an increased interest in IAH research on the part of American accounting researchers who had been investigating relationships between accounting variables and share-price returns for a number of years. Other events which have also been significant in the development of IAH research include the creation of the International Accounting Standards Board (IASB) as the successor to the IASC in 2001, and the European Parliament's approval in 2002 of the use of IAS/IFRS for listed companies in the EU. Fig. 2 provides a timeline of the important events in international harmonization which have had an impact on the development of IAH research.

The following section describes the methodology we used in this paper to investigate trends in IAH research.

3. Methodology

To explain our methodology, we first discuss the selection of materials pertaining to IAH; second, the selection of academic journals; third, the identification of articles; fourth, the classification of articles.

3.1. Selection of material pertaining to IAH

We initially attempted to identify all of the available literature pertaining to IAH, including: articles in academic journals; articles in non-academic journals; articles in newspapers; directives and other material issued by the European Commission; material

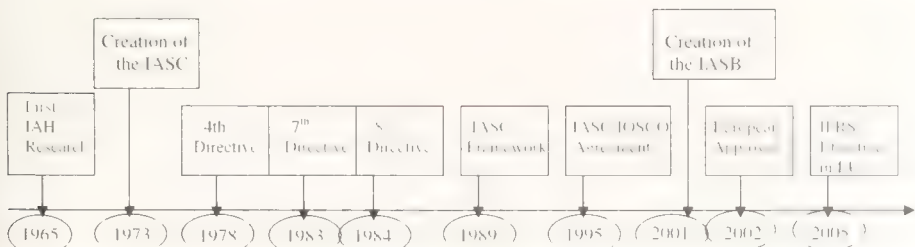


Fig. 2. Timeline of Important events in IAH

from accounting firms; chapters in accounting textbooks, and so forth. The extent of this materiel was formidable. By analyzing a sample of these documents, we concluded that the most important contributions to the literature have appeared in academic research journals which, therefore became the focus of our attention.

3.2. Selection of academic journals

In order to place a limit on the scope of the research, a decision was made to concentrate on English language accounting research journals. There were several reasons for this decision. First, we observed that non-English language journals are often intended for a national audience, and they do not publish a great deal of research on IAH. A second factor was that IAH specialists from various countries often publish their work in English language journals. Consequently, we decided to restrict our search to the English language journals shown in Appendix A. This list of journals includes all English language accounting journals with the word “international” in their title, as well as a number of other journals that are generally considered to be of high quality (see Lowe & Locke, 2005; Prather-Kinsey & Rueschhoff, 2004, for examples of previous studies which have looked at journal quality in the international arena).

3.3. Identification of articles

We reviewed all of the accounting research journals listed in Appendix A from the date of their inception. The identification of IAH articles was based on a systematic analysis of tables of contents, abstracts and keywords, focusing on the words: “harmonization” and “international accounting standards”. (Fig. 3) If the title or the keywords did not specifically include the keywords pertaining to our subject, but the abstract contained an idea that caused us to read the article, we read the article completely. Therefore, even if the title, keywords, or abstract did not mention IAH directly, we were able to identify articles pertaining to IAH. This process resulted in the identification of the articles listed in Appendix B. The first article identified was published in *The Accounting Review* in 1965

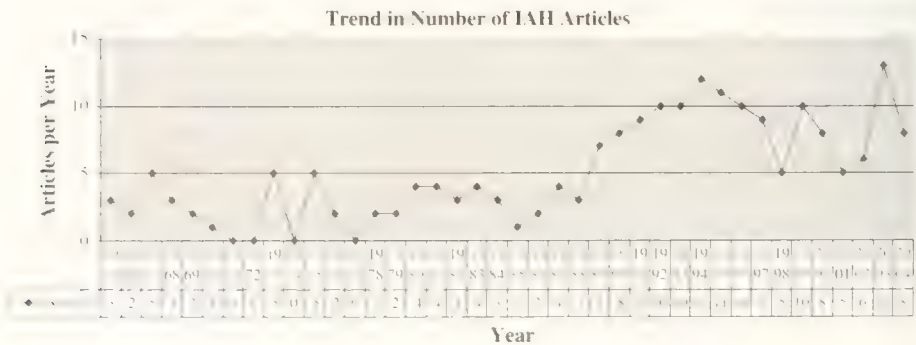


Fig. 3. Trend number of IAH articles.

(B: Kollaritsch, 1965).⁴ Consequently, our analysis begins in 1965 and extends through 2004.

4. Trends in IAH research

We identified 202 IAH research articles dealing with IAH published in the 24 accounting research journals listed in Appendix A during the time period 1965 to 2004 (see Table 1). The range of articles published per year was from zero in years 1970, 1971, 1974 and 1977, to a high of 13 articles in 2003. There was an increasing trend in the number of articles published per year (see Fig. 2), with an average of 2.3 articles per year in the period 1965–1973; 2.9 articles per year in the period 1973–1989; and 8.9 articles per year in the period 1990–2004. These time periods were chosen to indicate the relative change in IAH research over the total period examined. The first period corresponds with the time before the creation of the IASC in 1973. The second period extends from the creation of the IASC to the issuance of the IASC Framework in 1989, and the third period extends from the creation of the IASC Framework through 2004 (Fig. 3). Because of the length of time that it takes from the inception of a research project to its eventual publication, this division into three time periods is meant to be indicative of the trends in IAH research rather than implying a causal factor which explains the rate of growth.

4.1. Classification of articles by theme

In order to develop a method of classifying IAH research, previous articles which classified IAR, such as those of Meek and Saudagaran (B: 1990) and Zambon (B: 1996), were examined. Similar classification schemes by Van der Tas (B: 1992), Barniv and Fetyko (B: 1997) and Rahman, Perera and Ganesh (B: 2002) were also examined. In addition, certain themes were identified by studying the articles directly. Through a detailed process of reading and analyzing the IAH articles appearing in Appendix B, we were able to identify certain research themes. The initial themes were *Accounting Uniformity*, *Comparative Studies*, and *Reflections on the IAH Process*. The following section discusses these themes.

4.2. IAH research during the Initial Period: 1965–1973

4.2.1. Accounting uniformity

During the Initial Period, there was a strong interest in accounting uniformity (B: Wilkinson, 1965; B: Morgan, 1967). Wilkinson (B: 1965: 11) defined accounting uniformity as when: “each company presents only one set of accounts for all investors, of whatever nationality”. This interest in accounting uniformity was evident not only in the academic literature, but also in the practicing community. There were topics dealing with accounting uniformity at international congresses on accounting (Jennings, 1962) and, significantly, a compilation of accounting practices in different countries was prepared by the Committee on International Relations of the American Institute of CPAs (AICPA, 1965). This

⁴ The letter B before the reference indicates that the reference is found in Appendix B.

Table 1
Number of IAH articles, 1965–2004

Period	Number of articles in period	Average number of articles per year	Number using empirical methods	Percent using empirical methods (%)
1965–1973	21	2.3	3	14
1974–1989	46	2.8	14	30
1990–2004	135	8.9	67	50
Total: 1965–2004	202	5.0	84	42

publication appears to have signalled the emergence of IAH research. According to Wilkinson (B: 1965: 11), the AICPA publication was “in part a reply to the pleas for uniformity of accounting throughout the world that have been heard at almost every one of the more recently held International Congresses on Accounting.” There was also a belief on the part of both practicing and academic accountants that international harmonization of financial accounting standards would be achieved through a better understanding of differences in accounting practices in different countries (B: Beazley, 1968; B: Alhashim and Garner, 1973). Unfortunately, this belief proved to be ill-founded. Other authors who dealt with the theme of *Accounting Uniformity* included: Enthoven (B: 1973), Felt (B: 1968), Lowe (B: 1967), and Savore (B: 1969). The research methodology pursued by most of these authors was descriptive and normative, relying on archival texts in support of the author’s conclusions.

4.2.2. Comparative studies

Even though there was a general focus on achieving accounting uniformity, it became clear that there was also a need to explain differences in financial accounting practices, particularly among advanced industrial nations (B: Kollantsch, 1965; B: Davidson and Kohlmeier, 1966; B: Hatfield, 1966). Several authors attributed these differences to environmental factors. Among the factors identified were differences in culture and economic systems (B: Choi, 1973a,b; B: Mueller, 1968; B: Clapp, 1967; B: Davidson & Kohlmeier, 1966; B: Tyra, 1969). These authors also primarily used descriptive methodologies.

4.2.3. Reflections on the IAH process

There were also a number of articles which reflect on the impediments to achieving international harmonization during this Initial Period of IAH research (B: Hauworth, 1973; B: Mueller, 1965, 1967, 1970, Seidler, 1967). Among the impediments identified was the linkage between financial accounting standards and tax laws in many countries. These reflections often included recommendations pertaining to the creation of one set of internationally recognized accounting principles as a necessary pre-requisite to achieving international harmonization. See Table 2 for a summary of the IAH research published in the Initial Period.

4.2.4. Research methodologies used during the Initial Period

For the most part, the research methodologies used during the Initial Period were descriptive in nature, relying on subjective analyses of archival textual materials as support for recommendations and conclusions. Of the 21 articles identified during the Initial Period, only three articles (14%) used empirical methodologies where the researcher collected data

Table 2
Themes in IAH research during the Initial Period: 1965–1973

Theme	Articles (see Appendix B)	Number of papers	
Accounting uniformity	Alhashim and Garner (1973), Beazley (1968), Enthoven (1973), Felt (1968), Lowe (1967), Morgan (1967), Savoie (1969), Wilkinson (1965)	Descriptive:	8
		Empirical:	0
		Sub-total:	8
Comparative studies	Choi (1973a,b), Clapp (1967), Davidson and Kohlmeier (1966), Hatfield (1966), Kollaritsch (1965), Mueller (1968), Tyra (1969)	Descriptive:	5
		Empirical:	3
		Sub-total:	8
Reflections on the IAH process	Hauworth (1973), Mueller (1965, 1967, 1970), Seidler (1967)	Descriptive:	5
		Empirical:	0
		Sub-total:	5
Totals		Descriptive	18
		Empirical:	3
		Total:	21

and tested hypotheses using statistical methods. These three articles were authored by Davidson and Kohlmeier (B: 1966) and Choi (B: 1973a) in the *Journal of Accounting Research*; and Choi (B: 1973b) in *The International Journal of Accounting*. These three articles provide some evidence regarding the emerging influence of the *Journal of Accounting Research* within empirical accounting research and the influence of *The Journal of International Accounting* in international accounting research generally (see Table 2).

4.3. IAH research during the Intermediate Period: 1974–1989

After the creation of the IASC in 1973, several new themes emerged in IAH research. These new themes included: a focus on the creation of a *Conceptual Framework* for international accounting standards-setting as a means of fostering greater international harmonization; investigations of *Factors of the Environment* as a way to explain differences in accounting practices; discussions about the *IASC* as a way of enhancing the IAH process; and studies of the harmonizing effects of the *Accounting Directives* issued by the European Union. Some of these themes, such as the *Conceptual Framework*, reflected similar developments in standards-setting in the United States under the newly created FASB. In Europe, there was a growing interest in studying the effects of the *Accounting Directives* issued by the European Commission.

4.3.1. Continuing theme: Accounting uniformity

The continuing theme of Accounting Uniformity focused on the achievement of greater levels of international harmonization, with the eventual goal of achieving uniformity in accounting practices. Among the authors who addressed this theme were: Bromwich (B: 1980), Fitzgerald (B: 1981), Nair and Frank (B: 1981), Dopunik (B: 1987), Van der Tas (B: 1988). From the standpoint of methodology, Bromwich (B:1980) used an analytical modeling technique to examine international accounting harmonization. Van der Tas (B: 1988) introduced the use of the Herfindahl index to measure the extent of accounting homogeneity in different countries. However, in the other papers, the research methodologies were primarily descriptive and normative.

4.3.2. *New theme: Conceptual framework*

The idea of creating a conceptual framework to facilitate accounting harmonization was present in both the practicing and academic accounting literature in the United States for many years, extending to at least the work of Patton and Littleton (1940). The American conceptual framework was established by the Financial Accounting Standards Board (FASB) over a seven-year period between 1978 and 1985. With regard to international harmonization, Peasnell (1982) argued for the creation of a conceptual framework for financial accounting in the United Kingdom, and he felt that this should be extended to the international accounting standards-setting arena as well. Later, DePree (B: 1989) analyzed the structure of the FASB's conceptual framework and discussed its potential applicability to international accounting standards-setting. Other authors who investigated conceptual framework as a basis for achieving international harmonization included: Previts (B: 1975), Frank (B: 1979), Baxter (B: 1981), Nobes (B: 1981), Choi and Bavishi (B: 1982), Violet (B: 1983), Aitken and Islam (B: 1984), Taylor (B: 1987). Most of these authors used descriptive and normative techniques in pursuing their research rather than collecting empirical data and testing hypotheses. An exception was DePree (B: 1989) who used an analytical modeling technique to investigate the conceptual framework.

4.3.3. *Continuing theme: Comparative studies*

A number of IAH research articles were published during the Intermediate Period which compared accounting practices in different countries. Similar to the Initial Period, it was believed that accounting uniformity would emerge through a better understanding of differences. For example, Barrett (B: 1976) measured the degree of financial accounting disclosure by 103 companies in seven countries: Germany, the United States, France, Japan, the Netherlands, the United Kingdom and Sweden. He analyzed annual reports from 1963 to 1972 and concluded that the financial disclosure of English and American companies was more complete than in the five other countries. Comparisons between IAS and US GAAP also became common during this period. For example, Rivera (B: 1989) compared IASs and their American equivalents. For Fitzgerald (B: 1981), Choi and Bavishi (B: 1982) and McComb (B: 1979), the reduction of the differences was considered to be essential to the IAH process. Using the C index of conservatism, Gray (B: 1980) estimated the impact of differences in accounting standards on various measures of company performance. The identification of differences in financial performance alerted researchers to the possibility of studying relationships between capital market variables and accounting practices in the international setting. Other researchers who pursued this theme included: Burnett (B: 1975), Benston (B: 1976), Briston (B: 1978), DaCosta, Bourgeois and Lawson (B: 1978), Evans and Taylor (B: 1982), Nobes (B: 1983), Goodrich (B: 1986), Chow and Wong-Boren (B: 1987), Puxty, Willmott, Cooper and Lowe (B: 1987), Wallace (B: 1988), Biddle and Saudagaran (B: 1989), Cooke (B: 1989), and Rees and Sutcliffe (B: 1989). Many of these researchers used more rigorous research methodologies than previously, which involve the collection of data and the testing of hypotheses. Examples of these more rigorous studies included: Barrett (B: 1976), Choi and Bavishi (B: 1982), Gray (B: 1980), and Nobes (B: 1983).

4.3.4. *New theme: Factors of the environment*

During this period, two primary factors in the environment were hypothesized to explain differences in accounting practices in different countries: the cultural factor and the

economic factor. The impact of culture was the subject of research by various authors who used the cultural frameworks of Hofstede (1980) and Gray (B: 1988) to analyze differences between countries. Cultural variables also interested Violet (B: 1983) who attributed the relative lack of success of the IASC to cultural factors. Belkaoui (B: 1983) viewed language as a variable and studied the impact of language on accounting practices. Jaggi (B: 1975), Radebaugh (B: 1975), Ndubizu (B: 1984), Schweikart (B: 1985), Talga and Ndubizu (B: 1986), and Nair and Frank (B: 1980) also analyzed the impact of culture on accounting practices in various ways, including both empirical and descriptive methods.

The impact of economic factors on accounting differences was investigated by several authors. Gray (B: 1988) and Perera (B: 1989) concluded that international harmonization of accounting practices depended not only on the level of regulation within an economy, but also on macro-economic factors. Chow and Wong-Boren (B: 1987) analyzed micro-economic factors that impacted on accounting choices and the financial reporting practices of companies. Some researchers went further by proposing a classification scheme for countries according to economic factors in the environment. For example, DaCosta et al. (B: 1980) analyzed a number of economic factors influencing the accounting practices of various countries. They developed a classification scheme to differentiate countries according to these economic factors. From a methodological perspective most of the research within this theme was descriptive, however, there was a notable increase in the use of empirical methods, including the papers by Belkaoui (B:1983), Nair and Frank (B:1980), and Chow and Wong-Boren (B:1987).

4.3.5. New theme: The IASC

There were two primary sub-themes within this new theme addressing the IASC. The first sub-theme focused on histories of the IASC, and the second sub-theme dealt with International Accounting Standards (IAS).⁵ Shortly after the creation of the IASC, histories of the IASC began to appear. For example, Lord Benson, who was instrumental in creating the IASC, produced two histories of its founding (Lord Benson, 1976, 1989). Cummings (B: 1975) also discussed the background and origins of the IASC. Baxter (B: 1981) offered an analysis of the history, advantages and disadvantages of IASs. He also explained the international standard-setting process and he expressed concerns about the slowness of the process. Other research following this theme included: McKinnon and Janell (B:1984) and Wyatt (B:1989). From a methodological standpoint all of the research in this area was descriptive and normative.

4.3.6. New theme: Accounting directives

One of the primary reasons for the founding of the European Economic Community⁶ (EEC) was to create a free market for goods and services throughout Europe. The EEC also wanted to establish a uniform set of commercial laws to facilitate the creation of a common market. This led to the issuance of Accounting Directives which were intended to produce a uniform set of accounting standards among the member states of the European Union. Initially there was little interest on the part of accounting researchers in studying the Accounting Directives. This may have been because British and American researchers in the 1970s and 1980s did not believe that harmonization of accounting standards in the European Union was achievable, and

⁵ Now International Financial Reporting Standards (IFRS).

⁶ Today the European Union.

therefore they did not focus on this subject. Nevertheless, this theme eventually came to be of great interest to accounting researchers. For example, the 4th Accounting Directive issued in 1978 dealt with valuation rules, financial reporting standards, and annual reporting obligations. The origins of this Directive, dating from 1971, lay in German corporate law. Valuation rules were conservative and financial reporting standards were detailed. The entrance of Denmark, Ireland and the United Kingdom into the European Community led to a modification of the 4th Directive in 1974 in the direction of greater flexibility. The 4th Directive also introduced the concept of the “true and fair view” into European accounting standards-setting (B: Nobes, 1993). Burnett (B: 1975) surveyed the extent of harmonization achieved through the Directives, especially the 4th Directive. Also, Turley (B: 1983) discussed the impact of the 4th Directive on European corporate law. From a methodological perspective, all of the articles in this theme used descriptive and normative methods.

4.3.7. Summary of the research themes and research methodologies used during the Intermediate Period

In comparison with the Initial Period (1965–1973), the Intermediate Period (1973–1989) was characterized by an increase in the volume of research (46 articles versus 21 in the Initial Period). There were also more research themes. In addition to the recurring themes of *Accounting Uniformity* and *Comparative Studies* there were several new themes, including: the *Conceptual Framework*; *Factors of the Environment*; the *IASC*; and studies of the *European Accounting Directives*. These new themes reflected the growing interest in empirical research on the part of American accounting researchers. Of the 46 articles published during the Intermediate Period, 14 (30%) were empirical studies versus 14% in the Initial Period. However, there were still 32 (70%) articles which used primarily descriptive or normative approaches to IAH research. The principal journal for the publication of IAH research during the Intermediate Period was *The International Journal of Accounting*, which published 22 (49%) of the 46 papers. The two most important outlets for empirical research were the *Journal of Accounting Research* (5 articles) and *The Accounting Review* (5 articles). No other journal published more than two articles focusing on IAH research during the Intermediate Period. See Table 3 for a summary of the research articles in this period by theme.

The following section will discuss the Mature Period of IAH research (1990–2004).

4.4. IAH research during the Mature Period: 1990–2004

At the end of the Intermediate Period (1974–1989) there was still a lack of harmonization of accounting practices on an international basis. This prompted IAH researchers to investigate more thoroughly the factors that caused differences in accounting practices and to conduct their research in a more rigorous manner. Some authors developed ways to classify countries empirically according to their accounting practices. Others investigated correlations between environmental factors, such as economic and cultural variables, and different practices. A new theme emerged during the Mature Period which involved the investigation of relationships between differences in accounting practices and share-price returns in international capital markets. Another new theme measured the extent of IAH using various economic and statistical indices.

Table 3
Themes in IAH research during the Intermediate Period: 1974–1989

Continuing themes	New themes	Articles (see Appendix B)	Number of articles		
Accounting uniformity		Bromwich (1980), Nair and Frank (1981), Dopunik (1987), Van der Tas (1988).	Descriptive	2	
			Empirical	2	
			Sub-total	4	
	Conceptual framework	Previts (1975), Frank (1979), Nobes (1981), Aitken and Islam (1984), Taylor (1987), De Pree (1989)	Descriptive	3	
			Empirical:	3	
			Sub-total:	6	
Comparative studies		Barrett (1976), Benston (1976), Briston (1978), DaCosta., Bourgeois and Lawson (1978), McComb (1979), Gray (1980), Fitzgerald (1981), Choi and Bavishi (1982), Evans and Taylor (1982), Nobes (1983), Goodrich (1986), Puxty, Willmott, Cooper and Lowe (1987), Wallace (1988), Biddle and Saudagaran (1989), Cooke (1989), Rivera (1989), Rees and Sutcliffe (1989).	Descriptive	11	
		Jaggi (1975), Radebaugh (1975), DaCosta, Bourgeois and Lawson (1980), Nair and Frank (1980),Violet (1983), Belkaoui (1983), Ndubizu (1984), Schweikart (1985), Chow and Wong-Boren (1987), Talaga and Ndubizu (1986), Gray (1988), Perera (1989).	Empirical:	6	
			Sub-Total:	17	
			Descriptive	9	
			Empirical:	3	
			Sub-total:	12	
			Descriptive	4	
			Empirical:	0	
			Sub-total:	4	
			Descriptive:	3	
			Empirical:	0	
			Sub-total:	3	
	Reflections on the IAH process	The IASC	Cummings (1975), Baxter (1981), McKinnon and Janell (1984), Wyatt (1989)	Descriptive	4
				Empirical:	0
		Accounting directives	Burnett (1975), McComb (1982), Turley (1983)	Sub-total:	4
			Descriptive:	3	
			Empirical:	0	
			Sub-total:	3	
Totals			Descriptive:	32	
			Empirical:	14	
			Total:	46	

4.4.1. Continuing theme: Accounting uniformity

Using an interview approach involving Sir Bryan Carsberg, the General Secretary of the IASC, Schweikart, Gray, and Salter (B:1996) presented normative arguments in favor of accounting uniformity, which included: the increasingly globalized nature of business activities; the needs of the common market within the European Union; the increasingly globalized nature of capital markets; the privatization of many formerly public enterprises; and the need to reduce the costs of financial reporting. The importance of a conceptual framework in achieving accounting uniformity was investigated by Brown and Tarca (B: 2001), who compared the conceptual frameworks of the American, British, International and European standards-setting bodies. The normative arguments for greater accounting uniformity also led to strategies to increase international harmonization. Goeltz (B: 1991) considered international harmonization to be virtually impossible to achieve, but other authors focused on the importance of preserving the process towards increased harmonization and achieving eventual uniformity. Wallace (B: 1990) analyzed the external

Table 4

Themes in IAH research during the Mature Period: 1990–2004

Continuing themes	New themes	Articles (see Appendix B)	Number of papers
Accounting uniformity		Wallace (1990), Goeltz (1991), Purvis et al. (1991),	Descriptive: 17
		Chandler (1992), Wolk and Heaston (1992),	Empirical: 1
		Van Hulle (1993), Most (1994), Ijiri (1995),	Sub-total: 18
Comparative studies		Kenny and Larson (1995), Adams et al. (1993),	
		Cairns (1997), McGregor (1999), Brown and Tarca (2001),	
		Booth (2003), Dean and Clarke (2003), Jones and Wolnizer (2003),	
		Standish (2003), Barker (2004)	
		Bhoocha and Stansell (1990), Meek and	Descriptive: 15
		Saudagaran (1990), Nobes (1990),	Empirical: 8
		Biddle and Saudagaran (1991), Choi and Levich (1991),	Sub-total: 23
		Cooke (1993), Grove and Bazley (1993),	
		Frost and Pownell (1994), Yang and Lee (1994),	
		Boross et al. (1995), Roberts et al. (1996),	
		Schweikart et al. (1996), Zambon (1996),	
		Adhikari and Emeyonu (1997), Barniv and Fetyko (1997),	
		Sutton (1997), Nobes (1998),	
		Street and Shaughnessy (1998), Street and Gray (1999),	
		Ding et al. (2003),	
Impact on share prices and returns		Maines et al. (2003, 2004), Tarca (2004)	
		Meek (1991), Amir et al. (1993),	Descriptive: 3
		Pope and Rees (1992), Bandyopadhyay et al. (1994),	Empirical: 22
		Harris et al. (1994), Barth and Clinch (1996),	Sub-total: 25
		Rees and Elgers (1997), Harris and Mueller (1999),	
		Adam, Weetman and Gray (1993),	
		Alford et al. (1993), Hellman (1993),	
		Rahman et al. (1994), Saudagaran and Meek (1997),	
		Weetman et al. (1998), Aboody et al. (1999),	
		Pownall and Schipper (1999), Guenther and Young (2000),	
		Hung (2000), Schipper (2000),	
		Asbaugh and Pincus (2001), Asbaugh and Olsson (2002),	
		Dumontier and Raffournier (2002), Bhattacharya et al. (2003),	
		Leuz (2003), Bradshaw et al. (2004)	
Factors of the environment		Cooke and Wallace (1990), Perera and Mathews (1990),	Descriptive: 20
		Tay and Parker (1990), Weetman and Gray (1990),	Empirical: 10
		Riahi-Balkaoui and Picur (1991), Wallace and Gernon (1991),	Sub-total: 30
		Ndbuizu (1992), Ahadiat and Stewart (1992),	
		Fechner and Kilgore (1994),	
		Perera (1994), Baydoun and Willett (1995),	
		Hoarau (1995), Nobes (1995), Van der Tas (1995),	
		Hussein (1996), Taylor-Zarzeski (1996), Douppnik and Salter (1995),	
		Craig and Diga (1996),	
		Luther (1996), Sudagaran and Diga (1997),	
		Flower (1997), Salter (1998), Williams (1999),	
		Ali and Hwang (2000), Parker and Morris (2001),	
		HassabElnaby et al. (2003), Hope (2003a,b),	
		Evans (2004), Meek and Thomas (2004)	

Table 4 (continued)

Continuing themes	New themes	Articles (see Appendix B)	Number of papers
Accounting directives		Walton (1992), Emenyonu and Gray (1992), Nobes (1993), Zeff (1993), Hopwood (1994), Theunisse (1994), Herrman and Thomas (1995), Driggle and Nobes (1994), Thorell and Whittington (1994), Evans and Nobes (1998), Combarros (2000), Haller (2002)	Descriptive: 7 Empirical: 5 Sub-total: 12
		Measures of the extent of harmonization	Descriptive: 4 Empirical: 16 Sub-total: 17
		Implementation of IAS/IFRS	Descriptive: 5 Empirical: 5 Sub-total: 10
Total			Descriptive: 68
			Empirical: 67
			Total: 135

environment of the IASC in order to propose a survival strategy for that body. Chandler (B: 1992) argued for the acceptance of IASs, while Van Hulle (B: 1993) suggested four possible ways for the EU to proceed with respect to international harmonization: (1) stop harmonization efforts in the EU; (2) allow the IASC to determine the extent of accounting harmonization within the EU; (3) allow the Americans to dominate the IAH process; (4) call on the EU to become a more active player in the process. In retrospect, we can see that the second option was the one that was pursued. From a methodological standpoint, the articles in this theme continued to be primarily descriptive and normative; only one of the 18 articles used an empirical research methodology (see Table 4).

4.4.2. Continuing theme: Comparative studies

In the Mature Period, a number of researchers compared IAS/IFRS with U.S. GAAP. For example, Grove and Bazley (B: 1993) compared 20 IASs with their American equivalents. They also recommended certain accounting treatments which they believed would improve the efficiency of global capital markets. In addition, they estimated the costs and benefits of their recommendations. Street and Shaughnessy's (B: 1998) research described the evolution of accounting standards during the period 1973–1997; they discussed similarities and differences in financial reporting practices of the IASC and the national accounting standards-setting bodies of the United States, England, Canada and Australia. Nobes (B: 1990) examined the effects of IASs on financial reporting of American companies listed in the U.S. capital markets. Because US GAAP is more detailed than IASs: "for a US company that is obeying GAAP, it is very difficult not to comply with IASC standards" (p. 42). Nobes also

compared U.S. GAAP and IASs and concluded that the differences between IASs and U.S. GAAP have little impact on the financial reporting practices of American listed companies. Research in this area also indicated a growing convergence between international standards and American standards. Of the 23 articles included in this theme, eight (35%) were empirical and 15 (65%) continued to be descriptive or normative (see Table 4).

4.4.3. Continuing theme: Factors of the environment

Before 1990, two factors were identified as being the primary explanatory factors for differences in accounting practices: the cultural and economic. After 1989, other factors began to be considered and researchers argued that the diversity of accounting practices was caused by factors beyond the cultural and economic, including: the historical development of a nation's economy and its capital markets; differences in legal systems; differences in the nature of property rights; the size and complexity of companies within a country; the social climate; the degree of currency stability; the existence of accounting laws; and the educational system. The studies in this theme can be divided into two categories: studies emphasizing a single factor; and studies emphasizing a multitude of factors.

4.4.3.1. Studies emphasizing a single factor: The cultural factor has been one of the most studied variables to explain differences in accounting practices. Many authors have used Hofstede's (1980) or Gray's (B: 1988) cultural frameworks. For example, Tay and Parker (B: 1990), Baydoun and Willett (B: 1995) and Hussein (B: 1996) analyzed the accounting practices of industrialized countries based on cultural factors using the Hofstede framework. Riahi-Belkaoui and Picur (B: 1991) also found that cultural factors explained differences in accounting practices. These differences were also observed by Taylor-Zarzeski (B: 1996), who emphasized the importance of cultural variables for differences in financial reporting. In addition, he pointed out that multinational companies tend to present more information than national companies.

4.4.3.2. Studies emphasizing a multitude of factors: While various authors (B: Weetman and Gray, 1990; B: Nobes, 1990) privileged the idea of economic factors as the primary explanatory reason for differences in accounting practices, Wallace and Gernon (B: 1991) criticized these conclusions, arguing that there is no precise way to explain the reasons for differences in accounting practices among countries. The studies of Cooke and Wallace (B: 1990), Douppnik and Salter (B: 1995), Saudagaran and Diga (B: 1997), Salter (B: 1998), Craig and Diga (B: 1996), and Williams (B: 1999) also contributed to the analysis of multiple factors as having an influence on differences in accounting practices.

4.4.3.3. Studies emphasizing political factors: Luther (B: 1996) maintained that political factors were the primary reason for differences in accounting practices among countries. His premise was that conflicts exist between shareholders and other parties regarding the provision of accounting information. Political influences on accounting standards-setting is therefore inevitable. Consequently, accounting standards-setting can be seen as a political process where the point of view of the most powerful often prevails. Research in this area suggests that there has been domination of the IAH process by the major English speaking countries. For example, Chandler (B: 1992) examined the connections between IASC and

IOSCO from a political perspective. Ahadiat and Stewart (B: 1992) looked at the relationships between the SEC, the European Union and the IASC. Most of these studies emphasized the influence of American institutions such as the SEC and the FASB on international accounting standards-setting. Along this line, Hoarau (B: 1995) argued that international accounting harmonization is a pretence to achieve a consensus around the Anglo-American accounting model. In a similar vein, Flower (B: 1997) asserted that “for more than 20 years of the IASC existence, the attitude of the Americans was rather that of patronage.” From a methodological standpoint.

4.4.4. Continuing theme: Accounting directives

Three Accounting Directives were issued during the Intermediate Period of IAH research (1974–1989), but research pertaining to this theme began only to be significant about ten years later. The gap between the issuance of the Accounting Directives and researchers’ interest in studying the Directives suggests that researchers were waiting to see the reaction to the Directives within the European countries. With respect to the 4th Directive, Walton (B: 1992) sought to answer the question of whether the extent of accounting harmonization required by the 4th Directive allowed comparability of accounting information among European countries. Emenyonu and Gray (B: 1992) studied the extent of accounting harmonization in Germany, France and the United Kingdom. They use two indexes (chi-square and I) to analyze the annual reports of 26 companies in these three countries. Their conclusion was that there were significant differences between financial reports issued by companies in these countries, thus, indicating a lack of harmonization. This lack of harmonization was also observed by Theunisse (B: 1994) who found differences in financial reporting practices and discussed the consequences of these differences for financial statement analysis in three different countries (France, Belgium and Germany). She attributed the lack of harmonization to the options available under the 4th Directive, as well as the adaptation of accounting practices to national legislation and the socio-economic environment of each country. Herrmann and Thomas (B: 1995) studied the impact of the 4th Directive by adding Belgium, Denmark, Ireland, the Netherlands and Portugal to Emenyonu and Gray’s (B: 1992) sample. They argued that countries should be divided into two categories: those with a legal influence (Germany, Belgium, France and Portugal) and those with an economic influence (Denmark, Ireland, the Netherlands and the United Kingdom). The second category was considered to have a greater degree of harmonization than the first category. Nobes (B: 1993) also examined the introduction of the true and fair view by the 4th Directive and the effects of this requirement on accounting law and practice in the European Union. Finally, Zeff (B: 1993) analyzed the connotations implied by the true and fair view. With respect to the 7th Accounting Directive, Diggle and Nobes (B: 1994) analyzed the options available under that Directive in order to determine if consolidated accounts lead to harmonization. With respect to the 8th Accounting Directive, Evans and Nobes (B: 1998) focused on the development of rules contained in that Directive and examined the implementation of the Directive in England and Germany. There was also research that dealt with several Directives simultaneously. Thorell and Whittington (B: 1994) discussed the development of harmonization under the 4th and 7th Directives as well as under IASs. Haller (B: 2002) discussed the development of accounting standards in the European Union from the date of the issuance of the 4th Directive through 2002. Also, Combarros (B: 2000)

analyzed the evolution of financial presentation practices in the European Union. From a methodological perspective, research on this theme was about evenly split between empirical research (five studies out of 12) and descriptive/normative research (seven studies out of 12)(see Table 4).

4.4.5. New theme: Impact of harmonized accounting practices on share prices and returns

As capital markets have become increasingly globalized there has been a perceived need for more relevant and reliable accounting information in the international arena. As a result, securities exchanges have begun to require multi-national companies to prepare their financial statements in accordance with a recognized set of accounting standards. For example, companies using IAS/IFRS who want to raise capital in American capital markets have been required to reconcile their financial statements to U.S. GAAP using SEC Form 20-F. This requirement provided the background for Amir et al. (B: 1993), Pope and Rees (B: 1993), Bandyopadhyay et al. (B: 1994), Barth and Clinch (B: 1996) and Rees and Elgers (B: 1997), and others to study the effects of using foreign GAAP on raising capital in the United States. For example, Amir et al. (B: 1993) studied the value relevance of accounting numbers measured in accordance with U.S. and non-U.S. GAAP that were summarized in reconciliations of earnings and shareholders' equity as required by SEC Form 20-F. The research question was, do the reconciliations of accounting data from foreign GAAP to U.S. GAAP increase the associations between accounting numbers and share prices or returns? The results indicate that the reconciliations of earnings and shareholders' equity are value-relevant. This finding is important for public policy making and the setting of international accounting standards because it indicates the value of the reconciliations. In another study, Pope and Rees (B:1993) investigated the information content of two alternative accounting earnings measures constructed under U.K. and U.S. GAAP. Their analysis was based on data in the SEC 20-F filings by UK domiciled companies having ADRs listed in the United States. The research design involved testing the association between U.K. stock returns and alternative accounting numbers. The evidence indicated that U.K. GAAP earnings changes have incremental information content after controlling for U.S. GAAP earnings changes, but that earnings levels measured under U.S. GAAP also have independent incremental information content after controlling for U.K. GAAP earnings. The empirical results were consistent with prior research indicating that GAAP earnings adjustments add to the ability of earnings to explain share-price returns. From a methodological standpoint, research in this area is empirical involving data collection and testing of hypotheses, typically using theories based on variations of the capital asset pricing model. Of the 25 articles on this theme, 22 (88%) were empirical (see Table 4).

Other studies on this theme focused on the acceptance of IASs in international capital markets. For example: Schipper (B: 2000) argued in favor of IASs, but Harris and Mueller (1999) considered that the Form 20-F reconciliation requirement was insufficient to determine the degree of compatibility of IAS with U.S. GAAP. As IAH became more prominent as an area of research, there was a general extension of capital markets research into the international arena. One of primary questions studied by this line of research was whether the capital markets could be fooled by the presentation of different accounting numbers because of the application of different accounting methods in different countries. The use of different accounting methods may impact various accounting numbers (e.g.,

earnings, return on assets, return on equity, book value, price–earnings multiple, etc). Using the conservatism index of Gray (B: 1980), Adam, Weetman and Gray (B: 1993) analyzed the effects of using IAS on earnings and shareholders' returns. Weetman and Gray (B: 1990) and Hellman (B: 1993) demonstrated that variations in the degree of accounting harmonization in different countries can explain differences in the accounting numbers reported by companies (e.g., earnings). Weetman et al. (B: 1998) also investigated differences in the measurement of profits by comparing English, American and international standards. The same kind of diversity was observed by Aisbitt (B: 2001), for whom the harmonization of accounting standards argued in favor of the harmonization of tax systems. Alford et al. (B: 1993) also conducted studies of the relationships between accounting methods in different countries and share prices.

4.4.6. New theme: Measures of the extent of international harmonization

The general objective of the research conducted on this theme⁷ has been the measurement of the extent of international harmonization of accounting practices. This theme can also be classified according to the statistical method used to measure the degree of harmonization. Two types of measures were used: indices and statistical methods.

4.4.6.1. Indices. The H index (Herfindahl index) has been used to estimate the degree of harmonization at the national level, and the I index (a variation of the H index) has been used to measure the degree of harmonization at the international level. These indices were originally proposed by Van der Tas (B: 1988). Because the I index has certain limits, Herrmann and Thomas (B: 1995) proposed an alternative – the adjusted I index. However, because these indices do not allow for complete comparability of financial reporting practices, Van der Tas (B: 1988) also created the C index which measures the extent of international harmonization. Van der Tas expanded the C index to take into account the situation where information published in the footnotes allows reprocessing of data that later appear in the accounts. Archer et al. (B: 1995) divided the C index into two sub-indices: intra-national and international. The C index has been considered to be the most reliable way of measuring the extent of IAH, but criticisms have also been levelled against this method. Krisement (B: 1997) concluded that the number of observations affects the C index. In addition, he criticized of Archer et al.'s. (B: 1995) decomposed index because the sum of the intra-national and the international indices did not equal the global C index. These indices were also criticized by Cañibano and Mora (2000), who noticed the failure to include a significance measure. In their study, Cañibano and Mora used the C index and proposed a bootstrapping test to calculate the significance of a change in the C index value. Another test to measure the extent of IAH was the Wilcoxon test employed by Lainez, Callao and Jame (B: 1996) and also Aisbitt (B: 2001).

4.4.6.2 Statistical methods. A chi-square test was utilized by Tay and Parker (B: 1990) to investigate the extent of international accounting harmonization. Although the chi-square is easily calculated, it has several limitations because it does not consider the sample size and its value is not significant when the number of observations is low. To measure the extent of

⁷ Reviews of the literature on this theme can be found in Morris and Parker (B: 1999) and Cañibano and Mora (B: 2000).

harmonization in Sweden. Cooke (B: 1989) used Cramer's I' test and the coefficient of contingency (C) as a supplement to the chi-square test. Krisement (B: 1997) also applied Cramer's I' test to measure the extent of harmonization of accounting practices in nine European countries. Another statistical test used to measure the extent of harmonization involves the generation of linear regression models such as those developed by Archer, Delvaille and McLeay (B: 1996) and McLeay et al. (B: 1999). Taplin (B: 2003) argued that the H and C indexes are not adequate to measure the level of accounting harmonization. This is because there is a significant difference between an index (H or C) calculated for the sample and an index created for a population. He proposed that the standard error should be used. A summary of these different methodological approaches is shown in Table 5. Virtually all of the studies on this theme were empirical (16 out of 17 studies total)(see Table 4).

4.4.7. *New theme: Implementation of IAS/IFRS in different countries*

With respect to the implementation of IAS/IFRS, Glaum (B: 2000) investigated the evolution of German companies' attitudes towards financial reporting standards over a period of three years (1994–1997) using an empirical study. The German companies studied were characterized as having a negative attitude toward British and American standards (IASs/US GAAP) at the beginning of the study. Three years later, they changed their attitudes and accepted IASs. The transition to IAS/IFRS has also been investigated in Asian countries such as Japan and China. For example, Kikuya (B: 2001) discussed the participation of Japan in IAS/IFRS after 1990. Other studies of this nature included those of Cooke (B: 1991), Raty (B: 1992), Guenther and Hussein (B: 1995), Street and Bryant (B: 2000), Chen et al. (B: 2002), Abd-Elsalam and Weetman (B: 2003), Larson and Street (B: 2004), and Xiao et al. (B: 2004). From a methodological standpoint, the research in this area was evenly divided between empirical studies (five out of ten studies) and descriptive/normative studies (five out of ten studies)(see Table 4).

4.4.8. *Summary of the research themes and research methodologies used during the Mature Period*

In comparison with the Initial Period, and the Intermediate Period, the Mature Period (1990–2004) was characterized by an increase in the volume of research (21 articles in the Initial Period, 46 in the Intermediate Period, and 135 in the Mature Period). There were also more research themes. In addition to the recurring themes of *Accounting Uniformity*, *Comparative Studies*, *Factors of the Environment*, and *Accounting Directives* there were several new themes, including: the *Impact on Share Prices and Returns*, *Measures of the Extent of Harmonization* and *Implementation of IAS/IFRS*. These new themes reflected an even greater increase in the use of empirical research. Of the 135 articles published during the Mature Period, 67 (50%) were empirical studies versus 14% in the Initial Period and 30% in the Intermediate Period. Two new themes in this period, the *Impact on Share Prices and Returns* and *Measures of the Extent of Harmonization* relied almost exclusively on empirical research (see Table 4).

The principal journals for the publication of IAH research during the Mature Period were *European Accounting Review*, which published 26 (19%) of the 135 articles, and *The International Journal of Accounting*, which published 25 (19%) of the articles. Other important outlets were *Abacus* (12 articles), *Accounting and Business Research* (11 articles), *Accounting Horizons* (11 articles) and *Journal of Accounting Research* (10 articles). In

Table 5
Empirical studies measuring extent of IAH and tests used

Authors (see Appendix B)	Tests used					
	H	C	C _{modified}	I	I _{modified}	Others
Van der Tas (1988)	X	X		X		
Tay and Parker (1990, 1992)						X Concentration index
Van der Tas (1992a, 1992b)		X				X
Emenyonu and Gray (1992)				X		X
Archer, Delvaille and McLeay (1995)			X			
Hermann and Thomas (1995)				X	X	X
Archer, Delvaille and McLeay (1996)			X			Linear regression
Lainez, Callao and Jarne (1996)		X				Friedman's test, Wilcoxon's test
Krisement (1997)						V index
Adhikari and Emenyonu (1997)				X		X
McLeay et al. (1999)						Linear regression
Morris and Parker (1999)		X		X		
Lainez, Jarne and Callao (1999)			X			
Cañibano and Mora (2000)		X				X Bootstrapping test
Parker and Morris (2001)	X	X				X
Aisbitt (2001)			X			Wilcoxon's test
Chen, Sun and Wang (2002)						X
Taplin (2003)	X	X				Standard error
Ding, Stolowy and Tenenhaus (2003)						Logistic regression

comparison with the Initial and Intermediate Periods, a greater range of journals published IAH research during the Mature Period; especially interesting is the increase in the number of articles published by *European Accounting Review*.

5. Summary of the trends in IAH research and conclusion

In this review article we have discussed research on international harmonization of financial accounting standards published in major English language accounting research journals during the period from 1965 to 2004. Our discussion has concentrated on identifying the trends in IAH research and assessing the ways that this research has grown or been modified during the period examined. In summary, it can be seen from Tables 1, 2, 3 and 4 that there was a significant increase in the number of IAH articles published (from 21 in the Initial Period, to 46 in the Intermediate Period, to 135 in the Mature Period), and a significant increase in the use of empirical research methodologies (from 12% in the Initial Period, to 30% in the Intermediate Period, to 50% in the Mature Period). There was also an increase in the number of themes in IAH research, even though some of the themes remained essentially the same throughout the 40-year period. The various themes have been influenced by increasing levels of globalization, leading to demands for greater harmonization of financial accounting standards on an international basis, and by a growing interest in accounting practices in countries outside of the United States, particularly on the part of capital markets researchers. Certain key events in the process of international harmonization, such as the creation of the IASC/IASB and the Accounting Directives of the European Union have also affected researchers' interests and the themes that they have pursued.

During the Initial Period of IAH research (from 1965 to 1973), there was a strong concern with accounting uniformity, and also with comparing accounting practices in different countries. There was a belief that by understanding differences in practices, accounting uniformity could be achieved. It was quickly recognized, however, that there were significant impediments to achieving accounting uniformity on a worldwide basis due to a number of factors, including historical, cultural, economic, legal and political factors. The research approaches during this Initial Period primarily involved the use of descriptive compilations of differences in practices, and normative arguments in favor of eliminating differences in order to achieve the goal of accounting uniformity. After the creation of the IASC, in 1973, the interests of researchers began to shift towards an investigation of the reasons for differences in practices as well as advocating for the creation of a conceptual framework that would be able to reduce or eliminate accounting choices. Various attempts were made to increase harmonization of accounting practices among countries, including the creation of the IASC Framework (1979), and the agreement between IOSCO and the IASC that the IASC would establish a core set of accounting standards that could be used in international capital markets. These events marked the beginning of a more Mature Period of IAH research (1990–2004) in which there began to be more rigor in the research, often borrowing methodologies from American empirical research. IAH research during this more Mature Period focused on comparisons between IAS/IFRS and U.S. GAAP, including capital markets effects, and explanations for differences based on cultural, economic and other factors. This led to studies which statistically measured the extent of international harmonization. The changes in the trends in IAH research over the 40-year period examined are summarized in Table 6.

While uniformity of accounting standards has not yet been achieved, there is now a greater degree of accounting harmonization among industrialized countries, especially in countries that follow IAS/IFRS. Future IAH research will most likely focus on questions that can be answered through the use of empirical methodologies like those that have used in the major North American accounting research journals during the last 25 years. Tables 1, 2, 3, and 4 indicate that there has been an increased use of empirical research methodologies over the 40-year period studied. These tables also indicate that, while there has been a divergence in the themes of IAH research, there has also been methodological convergence. Future research will probably focus on attempts to measure the extent of compliance with IFRS in different countries. It is also expected that there will be an increased level of rigor and greater

Table 6
Themes in IAH research 1965–2004

Initial Period 1965–1973	Intermediate Period 1974–1989	Mature Period 1990–2004
Accounting uniformity	Accounting uniformity Conceptual framework	Accounting uniformity Conceptual framework
Comparative studies	Comparative studies Factors of the environment	Comparative studies Factors of the environment Comparisons of the value relevance of IAS versus US GAAP
Reflections on the IAH process	Studies of the accounting directives The IASC	Studies of the accounting directives Measures of the extent of harmonization Implementation of IAS/IFRS in different countries

use of theory in future research. The themes that were apparent in IAH research during the Mature Period will most likely continue. In conclusion, IAH research appears to have moved beyond Falk's (1994) criticism that most international accounting research lacked rigor and an adequate theoretical underpinning. Hopefully these trends will continue.

Appendix A. English language accounting journals selected for review

Name	Date of inception
Abacus	1965
Accounting and Business Research	1970
Accounting Historians Journal	1977
Accounting Horizons	1987
Accounting, Auditing and Accountability Journal	1987
Accounting, Business and Financial History	1990
Accounting, Organization and Society	1976
Advances in International Accounting	1987
Behavioral Research in Accounting	1989
Contemporary Accounting Research	1984
Critical Perspectives on Accounting	1990
Journal of Accounting and Economics	1979
Journal of Accounting and Public Policy	1982
Journal of Accounting Literature	1982
Journal of Accounting Research	1963
Journal of Accounting, Auditing and Finance	1977
Journal of Business, Finance and Accounting	1969
Journal of International Accounting, Auditing and Taxation	1992
Journal of International Accounting Research	2000
Journal of International Financial Management and Accounting	1989
The Accounting Review	1926
The British Accounting Review	1974
The European Accounting Review	1992
The International Journal of Accounting	1965

Adapted from: Lowe and Locke (2005) and Prather-Kinsey and Rueschhoff (2004).

Appendix B. List of IAH research articles

Abd-Elsalam, O. H., & Weetmar, P. (2003). Introducing International Accounting Standards to an emerging capital market: relative familiarity and language effect in Egypt. *Journal of International Accounting, Auditing and Taxation*, 12, 63–84.

Aboody, D., Barth, M., & Kasnik, R. (1999). Revaluations of fixed assets and future firm performance: Evidence from the UK. *Journal of Accounting and Economics*, 26, 149–178.

Adams, C. A., Weetman, P., & Gray, S. (1993). Reconciling national with international accounting standards. *European Accounting Review*, 2(3), 471–494.

Adhikari, A., & Emenyonu, E. (1997). Accounting for business combinations and foreign currency translation, an empirical comparison of listed companies from developed economies. *Advances in International Accounting*, 10, 45–62.

- Ahadiat, N., & Stewart, B. R. (1992). International geographic segment reporting standards, a case for the harmonization of accounting and reporting practices. *The International Journal of Accounting*, 27, 45–56.
- Aisbitt, S. (2001). Measurement of harmony of financial reporting within and between countries, the case of the Nordic countries. *European Accounting Review*, 10(1), 51–72.
- Aitken, M. L., & Islam, M. A. (1984). Dispelling arguments against International Accounting Standards. *The International Journal of Accounting*, Spring, 25–45.
- Alford, A., Jones, J., Leftwich, R., & Zmijewski (1993). The relative informativeness of accounting disclosures in different countries. *Journal of Accounting Research*, 31 (Supplement), 183–223.
- Alhashim, D. D., & Garner, S. P. (1973). Postulates for localized uniformity in accounting. *Abacus*, June, 9(1), 62–73.
- Ali, A., & Hwang, L. (2000). Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research*, 38, 1–21.
- Amir, E., Harris, T. S., & Venuti, E. K. (1993). A comparison of the value-relevance of US versus non-US-GAAP accounting measures using form 20-F reconciliations. *Journal of Accounting Research* 31(Supplement), 230–264.
- Archer, S., Delvaile, P., & McLeay, S. (1995). The measurement of harmonization and the comparability of financial statement items, within-country and between-country effects. *Accounting and Business Research*, 25(98), 67–80.
- Archer, S., Delvaile, P., & McLeay, S. (1996). A statistical model of international accounting harmonization. *Abacus*, 32(1), 1–29.
- Ashbaugh, H., & Pincus, M. (2001). Domestic accounting standards, international accounting standards, and predictability of earnings. *Journal of Accounting Research*, 39, 417–434.
- Ashbaugh, H., & Olsson, P. (2002). An exploratory study of the valuation properties of cross-listed firms' IAS and US GAAP earnings and book values. *The Accounting Review*, 77(1), 107–127.
- Bandyopadhyay, S. P., Hanna, J. D., & Richardson, G. (1994). Capital market effects of American-Canadian GAAP differences. *Journal of Accounting Research*, 32, 262–277.
- Barker, R. (2004). Reporting financial performance. *Accounting Horizons*, 18(2), 157–173.
- Barniv, R., & Fetyko, D. (1997). Attitudes of CPAs and financial executives toward harmonization of international accounting standards: an analytical and empirical examination. *Journal of Accounting and Economics*, 6(2), 149–169.
- Barrett, F. (1976). Financial reporting practices, disclosure and comprehensiveness in international settings. *Journal of Accounting Research*, 14(1), 10–26.
- Barth, M. E., & Clinch, G. (1996). International accounting differences and their relation to share prices: evidence from UK, Australian and Canadian firms. *Contemporary Accounting Research*, 13, 135–170.
- Baxter, W. T. (1981). Accounting standards – boon or curse? *Accounting and Business Research*, Winter, 3–10.
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Does public/private status affect the level of earnings management in code-law contexts outside the United States? A study based on the Spanish case

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Abstract

This study analyzes the difference in earnings quality between public and private firms in Spain. We go beyond the income-increasing incentives on which the United States debate has been exclusively based and build on previous Belgian results by considering institutional differences and differences in the type of blockholder and by proposing a new income-smoothing methodology.

No significant differences are found for income smoothers and increasers except for those included in the Spanish Ibex 35 index, which show lower manipulation levels due to the predominance of supervision over market pressure. Higher levels of income decreasing are found for private companies. We attribute this to the expropriation practiced by public firms through real activities in their relationship with the banks, which leads to a lower need to engage in downwards manipulation.

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Keywords: Earnings management, Public, Private, Blockholder, Income smoothing, Market index

1. Introduction

This paper tests whether there is a difference in the earnings quality of public vs. private firms in Spain. We first build on previous United States references that have widely signalled market pressure as the main driving force of higher income-increasing

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manipulation practices among public companies and we argue that this is not sufficient to explain the situation in less market-dependent economies.

In Spain, where most firms are privately held, the public/private debate is still an interesting one because public companies face great social, political, and media supervision and the different position of shareholders in the outsider/insider dichotomy creates a divergence in agency relations and information asymmetries between the two groups. Spain is a typical code-law country, where the presence of banks, not only as general providers of external finance, but also as key blockholders of many public companies, affects their interest in accounting information. Moreover, given that certain types of practices (income smoothing and income decreasing) have been defended in recent papers as highly typical of code-law countries (Leuz, Nanda, & Wysocki, 2003; García Lara, García Osma, & Mora, 2005; García Lara, García Osma & Mora, 2006), we extend our analysis towards a wider variety of incentives than those (almost exclusively limited to income increasing) discussed in the U.S. case.

The only results published so far, for a similar continental European context, on this public/private manipulation debate are those of Vander Bauwhede, Willekens, and Gaeremynck (2003) for Belgian firms. For this reason, and following encouragement from these authors,¹ we take their paper as a direct reference, considering the differences between the Belgian and Spanish cases. First, from an institutional point of view, both countries have high ownership concentration, somewhat higher in Belgium than in Spain. Additionally, banks have a much greater presence as blockholders of listed companies in Spain, so an interesting research question is whether differences in the type of blockholder could be affecting the results.

Second, the Belgian study fails to separate income smoothing from income increasing and decreasing (their vision of smoothing is based solely on the fact that income increasing/decreasing is practiced by the majority of below/above-target firms), so they do not carry out a test of the conflict in a real smoothing scenario. Our study includes such a test by proposing an alternative methodology that defines the smoothing area more precisely, based on the argument that not all above/below-target companies necessarily have earnings-stabilizing intentions. We establish smoothing limits that are based on the distance between post-managed (reported) earnings and our reference target (prior year's earnings) and consider that increasing/decreasing actions are restricted to observations outside these limits. We then formulate the public/private hypothesis for three (and not only two) different manipulation scenarios: *income smoothing*, *income increasing* and *income decreasing*.

Finally, their study matches public and private firms by using a similar number of companies in both groups which makes it more difficult to generalize results for a population where the vast majority of firms are privately held (Vander Bauwhede & Willekens, 2004). As this same situation occurs in Spain, our sample tries to represent the population better by including a much greater proportion of private firms.

¹ Belgian law is representative of the French family of law systems. We believe, therefore, that the hypotheses we derive can be tested in other continental European countries that belong to the same class of accounting and family of law systems such as Spain, France, Portugal, Turkey, Italy, etc. (Vander Bauwhede et al., 2003, p. 4).

We develop a multivariate model regressing earnings quality on a public/private dichotomous variable and several control factors. Earnings quality is measured using discretionary accruals obtained from the Modified-Jones model (Dechow, Sloan, & Sweeney, 1995).

Descriptive statistics reveal that below (above) target firms mostly engage in increasing (decreasing) actions, respectively, and that both types of incentives coexist with income smoothing in Spain.

No significant differences are found between public/private income smoothers, denoting that stakeholder pressure on private firms to stabilize their earnings is similar in strength to that found in public firms. The latter are clearly influenced by banking regulation that penalizes both their income volatility and that of their subsidiaries.

Results also reject the existence of differences in income-increasing practices. The higher dependence of private firms on banks as creditors forces them to increase reported numbers to influence contractual outcomes. In the public case, although less pronounced than in the United States, there is still some kind of market pressure that maintains earnings levels in Spain. Although the Belgian study also fails to find income-increasing differences, which they attribute to lower market pressure than in the United States, we further replicate our analysis by sub-periods and by sizes and find that, when dealing with only very large companies, lower levels of upwards manipulation are found for the public group. This denotes that the cost-benefit of manipulation is, for the most relevant listed Spanish companies (those included in the Ibex 35 Spanish index out of a total of 150 listed firms), clearly influenced by a stricter scrutiny of market regulators and analysts and by higher reputation costs. We also find that firms in the Ibex 35 index show lower levels of manipulation than a parallel group of smaller listed firms. Thus, it seems that different behaviors could exist even within the public group, reflecting the relevance of this type of index in code-law stock markets.

As regards income-decreasing actions, higher levels are clearly associated with private companies, in line with results presented for the Belgian case, which they attribute to high earnings levels that result in wage-increase demands from employees and higher taxation. Accepting expropriation of outsiders as a widespread managerial practice in Spain, we propose an alternative explanation based on the argument that public firms carry out this expropriation basically through real activities in their relationship with the banks and, thus, have a much lower need to engage in income-decreasing practices. Contrary to the Belgian findings, we do not find differences in income-decreasing practices for the above-target firms that lie inside our smoothing limits.

Our results are robust to several tests like the assignment of non-smoothers as income increasers (decreasers) independent of their previous above (below) target status, the use of two alternative earnings-management models (*Cash Flow* and *Accounting Process* models), or the inclusion of post-managed (reported) earnings instead of pre-managed earnings when controlling for profitability.

This study contributes to the public/private manipulation debate by presenting evidence for a European context where a different set of arguments is needed to that normally employed for the United States case. The fact that most firms are privately held in Spain, that a special relation exists between public companies and institutional blockholders, and that income-decreasing and smoothing actions are engaged in much more frequently than in

the United States, turns the debate into a much more complex and interesting one. We also extend the only results previously published for a similar code-law country (Belgium) by considering the possible effects of the different types of public blockholders and by treating income smoothing as a manipulation action that is independent of income increasing or decreasing. As the Belgians limit their analysis to the last two options, our paper contributes by testing public private smoothing differences for the first time.

Finally, we find different behaviors within the public group. Contrary to what happens in the United States case, for relevant indexed companies the supervision factor seems to be more influential than market pressure, leading to lower upwards manipulation than for other firms. This stratifying behavior within listed firms has not been reported before.

The rest of the paper is organized as follows. Section 2 discusses how to deal with the public private conflict in code-law countries like Spain. In Section 3 we review the literature and theories about the different manipulation incentives that coexist in Spain and we develop hypotheses on the public/private conflict for our three different incentive scenarios. Section 4 includes the research methodology, sample, and descriptive statistics. In Section 5 we present the main results and, finally, the summary and conclusions appear in Section 6.

2. The public/private conflict in code-law countries

2.1. Accounting manipulation in code-law countries

Research debates about the two offset forces that drive the public private accounting-quality conflict in the United States seem to agree that market pressure is stronger than supervisory regulation and explains evidence of higher levels of earnings manipulation among public firms (Klassen, 1997; Mikhail, 1997; Beatty & Harris, 1998; Beatty, Ke, & Petroni, 2002). This argument, however, does not hold when institutional differences lead to the emergence of alternative incentives in less-market-dependent economies like those of some European countries. Whether, in these contexts, the public private conflict is still an interesting debate requires a wider variety of arguments than those simply based on market pressure.

Recent literature not only finds that code-law countries show higher levels of earnings manipulation (Burgstahler, Hail, & Leuz, in press; Hung, 2001; Leuz et al., 2003) but also that several specific incentives like *income smoothing* or *payout-driven income decreasing* are more commonly practiced in some European countries than in the United States (Ball, Kothari, & Robin, 2000; Leuz et al., 2003; García Lara et al., 2005, 2006).

Most companies in code-law regimes are privately held¹ and although empirical research (following the United States model) has usually been limited to public companies, the study of how management incentives affect private companies is essential (García Osma, Gil de Albornoz, & Gisbert, 2005) and still not well documented (Coppens & Peek, 2005). It is only recently that some papers have recognized the role of private companies in Europe and the need to extend accounting-quality studies to them (Burgstahler et al., in

¹ Private firms constitute the majority of the EU economy and the EU market for audit services (Van Tendeloo & Vanstraelen, 2005).

press; Coppens & Peek, 2005; Van Tendeloo & Vanstraelen, 2005; Peek, Cuypers, & Buijink, 2006).³ This emerging interest not only keeps the public private discussion alive but also makes it more relevant than in the United States.

The possibility of a difference between the earnings quality of the two groups relies on the fact that, although few in number and not submitted to as much pressure as in the United States, listed companies in continental European countries are socially and politically relevant, suffer from higher media supervision and reputation costs and their ownership structure presents some unique attributes that might condition their manipulating behavior. The evidence that public private firms respond differently to institutional factors (Burgstahler et al., in press) justifies the comparison of their manipulation levels in a European code-law context (Spain) in which, with the exception of the Belgian case, no previous evidence exists.

2.2. *The Spanish case compared to the United States and Belgium*

Spain is a typical code-law regime with remarkable institutional differences compared to the United States. Stock markets are far less developed. Only an average of 150 firms have been listed on the interconnected (continuous) market in the period 1996–2002, which gives a number of 3.75 per one million inhabitants as compared to 30.1 in the United States. The ratio of market capitalization to Gross Domestic Product (GDP) during this period was 71.47, compared to 82 in the United States. As expected in any relationship-based financial model, banks are a major source of business finance in Spain. Bank loans to the private sector (measured as the ratio of claims of deposit money banks over GDP in the year 2000) was 1.012 and 0.493 in Spain and the United States, respectively (Rajan & Zingales, 2002).

Important differences are also found in legal protection and judicial enforcement. An indicator of the rights that minority shareholders have to challenge incumbent managers (Laporta, López, Shleifer, & Vishny, 1998) shows a high score of five for the United States compared to a mere two for Spain. Litigation risk is almost non-existent in Spain.

Most arguments regarding the public private conflict in the United States are, in fact, debating about ownership concentration. Despite the fact that concentration levels in Spain do not reflect the public private conflict so well (concentration levels are high both for public and private companies), a special kind of shareholder is found that drives incentives differently.⁴ Whereas most private companies are family-owned or subsidiaries of multinationals, blockholders of listed companies are mainly of an institutional character like banks or savings banks, which makes Spain a very interesting case (Casasola & Tribo, 2004).⁵

³ In fact, most United States research highlighting the relevance of market manipulation incentives has been carried out using only public firms, which is logical as the economic role of private firms is quite low.

⁴ Peek et al. (2006) highlight the importance of the difference between closely widely held public companies for a proper understanding of agency conflicts.

⁵ During the last decade, Spain has witnessed the liquidation of former public monopolies where the State has been substituted by institutional investors, mainly banks, that have established stable cores promoted, in part, by the Spanish government to maintain their national character. A recent example of this is the debate that arose after Spanish Gas Natural and German E.ON launched a public offer for all outstanding shares of the Spanish electricity company Endesa.

For a general sample taken from the Spanish Sabi database, an average of 25% of public firms have a bank as one of their two largest shareholders, whereas for the private group this is only true for 6%. Because banks in Spain also act as representatives of important percentages of stocks in the hands of individuals or investment funds, the same as described for Germany (Köndgen, 1994), it is clear that they will typically dominate voting rights in listed companies and their simultaneous roles as managers, supervisors and reference creditors will create different types of information asymmetries than those affecting private firms.

The presence of a bank as the main blockholder has been interpreted in terms of willingness to expropriate the minority. Casasola and Tribó (2004) demonstrate that Spanish banks expropriate wealth from minority shareholders, and find a negative effect on a firm's return when a bank becomes its main shareholder. In Germany, Goergen, Renneboog, and Correia (2003) also find that firms whose ownership structure includes banks, pay lower dividends, which they take as a signal of expropriating intentions. The interest of banks in their insider business, even at the expense of their subsidiaries, will make accounting numbers less informative.

The fact that Spanish banks act as main blockholders in many public companies could be considered a unique characteristic even with respect to Belgium, the only other code-law country for which results on the public private manipulation debate have been published so far. Vander Bauwhede et al. (2003) find no income-increasing differences and a higher tendency of private Belgian firms to practice income decreasing, but their hypotheses are simply based on market-pressure arguments. Ownership concentration is somewhat higher in Belgium than in Spain. Property owned by the largest three shareholders is 60% vs. 50% (Laporta et al., 1998), but the percentage of banks as blockholders of Belgian public firms is only 3% (Goergen & Renneboog, 2000). Therefore, an interesting research question is whether both the slightly higher concentration level and, especially, the type of blockholder are affecting the results of the public private manipulation debate.

At the same time, and though operating in a market with lower pressure, the small number of companies listed in Spain is submitted to important social, political, and media supervision which leads to serious reputation costs but, at the same time, maintains a certain avoidance of reporting low-earning figures.⁶ The fact that, in code-law countries like Spain, strictly controlled indexes are created for a reduced number of relevant, listed firms means that this confrontation between pressure and supervision could be also dependent on membership in the Spanish Ibex 35 index.

The literature on ownership structure has recently broadened its main focus by considering not only agency problems between managers and shareholders but also between large and minority shareholders (Bloch & Hege, 2001; Gomes & Novaes, 2001, etc.). In fact, the extension to an *outsider's* vs. *insider's* vision of the conflict proposed by Leuz et al. (2003) seems perfect to represent what happens in Spain. For public firms, insiders (including managers and banks, both as blockholders and creditors) use their

⁶ The Spanish National Stock Exchange Commission, which is the Spanish Stock Exchange regulator equivalent to the SEC in the United States of America, keeps an Official Register of audited annual accounts, freely accessible to the public through the internet. Access to private companies' accounting information is more costly and difficult to obtain.

control over the firm to benefit themselves at the expense of outsiders (minority owners and the other stakeholders). For private firms, banks, acting only as creditors, are part of the outsider group which increases their demand for relevant accounting information. The existence of this double scenario not only keeps the public private conflict alive but also forces us to look for more specific incentives or accruals to test for differences in accounting quality.

3. Different types of incentives coexisting in Spain. Development of hypotheses

The stakeholder model typical of low-enforcement countries like Spain encourages certain kinds of manipulation. Leuz et al. (2003) find that earnings management is more pervasive in countries where legal protection of outsiders is weak (continental Europe and Asia) because insiders enjoy greater private control benefits and have stronger incentives to obfuscate firm performance. Similar evidence is obtained by Van Tendeloo and Vanstraelen (2005) for a sample of private European firms and by Burgstahler et al. (2006) for a combination of public private firms in which they confirm the central role of enforcement mechanisms over financial-reporting practices. These references provide evidence of higher levels of manipulation but do not investigate whether they are increasing or decreasing or the varied incentives that might be driving them.

Building on this evidence, García Lara et al. (2005) provide consistent arguments that explain why continental European managers persistently engage in more income-decreasing strategies: existing links between reported income and current payouts to different stakeholders, the pecking order theory and the less-pronounced market pressure to manage earnings upwards. They find that the discontinuity in the earnings distribution on the positive part of earnings is much stronger for Germany and France than for the United Kingdom, which is evidence of greater income-decreasing practices. In a subsequent paper, García Lara et al. (2006) collect evidence (Ball et al., 2000; Leuz et al., 2003; Bao & Bao, 2004) that firms in code-law countries tend to smooth earnings to a much higher degree than their common-law counterparts.

A key point for our paper taken from these references (García Lara et al., 2005, 2006) is that two different types of incentives (income decreasing and income smoothing) are broadly accepted to coexist in continental countries like Spain, so it will be necessary to analyze their effects separately. Based on some national references (Azofra, Castrillo, & Delgado, 2003; Gallén & Giner, 2005), we extend our analysis to include a third incentive (income increasing) and present separate hypotheses (H2 and H3) for below (above) target firms whose increasing (decreasing) manipulation practices lie outside the limits of what we consider real income smoothing, to which we devote Hypothesis 1.

Burgstahler et al. (2006) explore the interaction between market forces and several institutional variables and find that some of their effects (e.g., book-tax alignment, outside investor protection, etc.) are mitigated by the market, improving the quality of earnings in

García Lara et al. (2006) use this argument as a base on which to analyze the opposite effects of these two manipulating actions on earnings conservatism (an alternative dimension of earnings quality) and find that income decreasing incentives dominate those of income smoothing. They argue that managers would choose different time frames and types of accruals to achieve each of these objectives

listed firms. Their manipulation variables are, nevertheless, taken from a very general point of view and do not permit a segregation of the analysis into the three separate types of incentives.⁸

3.1. The income-smoothing hypothesis

Beidelman (1973) defined income smoothing as an attempt on the part of the firm's management to reduce abnormal variations in earnings to the extent allowed under sound accounting and management principles. This definition has been subsequently extended to include GAAP departures (Gallén & Giner, 2005).

In a review of smoothing methodology, Moses (1979) classifies approaches as *one-period (annual)* and *multi-period*, the former trying to identify smoothing attempts and the latter whether smoothing had been achieved in the long run.⁹

Annual approaches are based on the redirection of pre-managed earnings towards a certain target. The income-smoothing hypothesis is defined as the propensity of managers to increase (decrease) reported earnings when pre-managed earnings are below (above) the target. Among the possible targets, *last year's earnings* is the most commonly tested (Vander Bauwhede et al., 2003) but other references like median sector data, analysts' forecasts, etc., have also been used (DeFond & Park, 1997; Gill de Albornoz & Alcarria, 2003).

Bao and Bao (2004) point out two reasons why the study of income smoothing has been more successful than that of other forms of earnings management: its more precise definition and the success in differentiating between smoothers and non-smoothers. The hypothesis behind many annual studies that all firms above (below) a target necessarily have smoothing intentions is not a particularly precise point of view. Building on García Lara et al. (2005, 2006), we argue that important incentives other than income smoothing (e.g., reducing payout levels) could be hidden in such a broad vision of the term.

Prior efforts to analyze the factors affecting income smoothing have been confined to listed firms (Healy, 1985; Gaver, Gaver, & Austin, 1995; DeFond & Park, 1997; Chaney, Jeter, & Lewis, 1998; Young, 1998), but it makes sense to extend this strategy to the private group, especially if we consider previous references to the higher level of income smoothing in code-law countries. This extension is supported by Trueman and Titman (1988) who link income stability with the claimholder's perception of firm risk, thus reducing the firm's cost of capital.

⁸ In fact, some of their institutional factors (e.g., book-tax alignment) are more related to income-decreasing practices than to a real idea of smoothing.

⁹ One of the most widely used income-smoothing indicators in the *multi-period* approach is the comparison of the coefficient of variation of a period change in earnings with the coefficient of variation of a period change in an alternative measure that is apparently free of manipulation, like sales or operating cash flow (Albrecht & Richardson, 1990; Booth et al., 1996; Michelson et al., 1995, 2000; Bao & Bao, 2004). Generating sales is a real economic activity and so the variability of earnings will be smaller than that of sales for an income smoother (Imhoff, 1981). Other studies have used correlation levels between operating cash flow and accruals based on the idea that a negative value is always expected because of the role of accruals, but an excessively high negative one will be the consequence of accruals being discretionary.

As we remarked in Section 2, banks have a special relationship with public companies in Spain, enjoying a privileged position on their boards of directors and acting simultaneously as reference creditors. Considering that bank-leverage regulations penalize bank-income volatility and, consequently, that of their subsidiaries (Ball et al., 2000; García Lara et al., 2006), and that Spanish analysts will still positively assess earnings persistence to a certain extent, we should expect that listed firms would engage in greater smoothing actions to reach these persistence objectives.

An alternative theory (Trueman & Titman, 1988) relies on creditors also looking at earnings variability to evaluate the risk levels of their clients, which is a very common practice in Spain. That would make private firms, whose outsider bank creditors suffer from greater information asymmetries, more dependent on earnings as a signalling device and, hence, willing to smooth their earnings to a greater extent. An empirical question is, then, which of these opposite effects prevails and whether a first-order market effect exists on income-smoothing practices in Spain. Our first hypothesis is:

Hypothesis 1. Spanish companies (public and private) engage in real income-smoothing practices but no significant difference exists in the level practiced by both groups.

This first hypothesis was not separately tested in the Belgian study (their vision of income smoothing was based solely on the fact that income increasing/decreasing is practiced by the majority of below/above-target firms), so they do not carry out a test of the public/private conflict in a real smoothing scenario. Our study includes such a test by proposing an alternative methodology that defines the smoothing area more precisely, arguing that not all above/below-target companies necessarily have earnings-stabilizing intentions.

3.2. The income-increasing hypothesis

Although not as clearly as in the Anglo-Saxon literature, where extensive empirical research evidences that income-increasing practices are mainly the consequence of market pressure (Albarbanell & Lehavey, 1999; Burgstahler & Fama, 1999; Degeorge, Patel, & Zeckhauser, 1999; Payne & Robb, 2000), some papers defend that listed firms could have incentives to increase earnings in Spain too (Azofra et al., 2003; Gallén & Giner, 2005). It is an open question whether a real smoothing intention could be behind this increasing behavior, but it seems reasonable to think that, although less pronounced, some kind of market pressure might still prevail that forces public firms to opportunistically increase earnings with an *other than smoothing* aim. The lower degree of ownership concentration could explain this greater pressure and the possibility of obtaining different results than those from Belgium, where no significant differences were found between public and private companies in the income-increasing sense.

The important presence of banks as blockholders of public companies will tend, nevertheless, to reduce the above incentives because access to private-information channels will lessen the importance of accounting numbers. Neither must we forget that there are, in Spain, control systems inherent to listed firms: careful supervision from the National Stock Exchange Commission and analysts (especially for firms belonging to carefully monitored indexes like the Spanish Ibex 35), free access to their accounting information through the Internet, and the almost exclusive presence of the Big N audit

companies.¹⁰ Additionally, in the private case, the huge dependence on banks, in this case as providers of external finance, especially in the short term, will also force firms to increase reported numbers to influence contractual outcomes.

If we compare the situation with the United States, it seems reasonable to expect lower levels of income increasing in public companies, which will make it more difficult to find a difference between public and private companies in Spain.

Regarding the Belgian results, it is an open question whether the higher pressure derived from the slightly lower concentration levels could be stronger than both public supervision and the incentives of private companies. However, we find it reasonable to think that the differential role of banks as blockholders of public companies will make private firms practice upwards manipulation to a greater extent. Our second hypothesis is, therefore, that:

Hypothesis 2. For below-target firms, income-increasing incentives other than income smoothing are greater for private than for public Spanish companies.

3.3. *The income-decreasing hypothesis*

The literature clearly suggests that income-decreasing practices are common in code-law countries but not that these incentives are exclusive to public firms. Laporta, López, Shleifer, and Vishny (2000) argue that listed firms in these regimes have more incentives to present high payout ratios as a signal of a lower expropriation, which explains the use of income-decreasing actions to achieve them. Building on the evidence presented by Casasola and Tribó (2004), we agree with this payout incentive but argue that, in Spain, the power of banks will allow this type of expropriation to be achieved through real activities (e.g., higher interest rates and commission costs imposed on their subsidiaries), making income-decreasing practices unnecessary for public firms.

Arguments regarding tax minimization, used by Vander Bauwhede et al. (2003) to justify differences in the Belgian case, propose that a direct relation exists between book-tax alignment and manipulation levels but that public firms are less sensitive to it (Burgstahler et al., in press). Recognizing that accounting numbers have a strong dependence on tax legislation in Spain,¹¹ we argue that tax-saving intentions are not exclusive to private firms but that public companies could be achieving them through a more efficient use of timing differences, that is, without the cost of penalizing their reported earnings.

The expropriation arguments above lead us to expect greater levels of income decreasing among private firms. Both the maintenance of a certain market pressure and the higher supervision inherent to public firms (National Stock Exchange Commission, higher presence of Big N auditors, etc.) would reinforce arguments supporting our expectation.

¹⁰ According to the National Stock Exchange Commission, about 85% of Spanish public companies are audited by a Big N (94% in the case of firms in the Ibex 35 index). This percentage is much lower in the private case (around 20% according to Arnedo, Lizarraga, & Sanchez, 2006).

¹¹ In Spain, all entries in the books are relevant for tax purposes with the exception of permanent and timing differences.

which is, then, similar to the one proposed for the Belgian case, but based on reasons that go beyond both mere tax minimizing incentives or the lower market pressure.

Hypothesis 3. For above-target firms, income-decreasing incentives other than income smoothing are greater for private than for public Spanish companies.

4. Research design, sample and descriptive statistics

4.1 Reference target, pre-managed earnings and incentives other than smoothing

We use last year's earnings as our target as it fulfils the condition that firms try to meet a simple benchmark (Burgstahler & Dichev, 1997; Payne & Robb, 2000; Vander Bauwhede et al., 2003). Following recent studies (Young, 1998; Gill de Albornoz & Alcarria, 2003), we define pre-managed earnings as current year's reported earnings minus discretionary accruals, the latter used as our earnings-management measure. Our earnings variable is ordinary income after taxes, that is, excluding extraordinary items.

Recent annual studies link the existence of income smoothing merely with the practice of income increasing decreasing by firms below above a target (Young, 1998; Gill de Albornoz & Alcarria, 2003; Vander Bauwhede et al., 2003). The use of such a broad definition of the term "smoothing" leads to two kinds of problems. First, firms whose earnings variation increases instead of diminishing (the distance to the target is greater after manipulation) will not show a real smoothing intention. Second, firms that, even when reducing the distance, show incentives other than smoothing will not be properly controlled. Confining the target distance to a limited interval in accordance with a more credible smoothing aim will permit us to analyze the smoothing behavior and other manipulation incentives, separately.

We establish smoothing limits based on the distance between post-managed (reported earnings) and our reference target (prior year's earnings) and test the increasing decreasing hypotheses using only observations outside these limits under the argument that manipulation incentives other than smoothing clearly exist in Spain and that it is necessary to analyze their effects on the conflict separately.

To test H1, an *income smoother* is identified when post-managed (reported) earnings lie inside a confined distance (percentage) above below the target. We test intervals of 20%, 10% and 5% around our prior year's earnings target. H2 and H3 are consequently restricted to what we call *non-smoothers*, that is, firms above (below) target whose post-managed (reported) earnings lie outside these ranges.

4.2. Earnings-management measure

The Modified-Jones model is used to obtain discretionary accruals and pre-managed earnings. Dechow et al. (1995) propose a modification of the original model (Jones, 1991) that regards revenues as entirely non-discretionary. They first estimate coefficients for the original model and then apply them to the following version:

$$\frac{TA_{it}}{A_{it-1}} = \beta_0 + \beta_1 \left(\frac{1REV_{it}}{A_{it-1}} - \frac{1REC_{it}}{A_{it-1}} \right) + \beta_2 \frac{PPE_{it}}{A_{it-1}} + \epsilon_{it} \quad (1)$$

where TA represents total accruals computed as the yearly change in current accruals (change in current ordinary assets, except for cash, minus the change in current ordinary liabilities) minus fixed assets amortization. REV represents revenues; PPE is gross property plant and equipment; ΔREC represents the change in accounts receivables. A is total assets, used to deflate all the variables in the model to control for scale effects. Discretionary accruals are obtained as the error term of the above regression.

4.3. Sample selection

We estimate cross-sectional versions of the *Modified-Jones* coefficients for each industry (two-digit Spanish C.N.A.E.) and year combination. To do so, we take all the available industrial and commercial firms from the period 1996–2002 that include a clean audit opinion as an approach to the “absence of earnings management” assumption.¹²

For the testing of our hypotheses, we construct a second sample where we relax the clean audit opinion requirement but force private firms to have minimum total assets similar to those from each year–sector combination of public firms.

This *testing* sample has a total of 46,131 firm-year observations, (745 of them for public firms) with a minimum of 4,863 in 1998 and a maximum of 5,856 in 1999. It is trimmed to exclude extreme values of absolute signed discretionary accruals (scaled by lagged total assets) greater than one.

4.4. Multivariate model

To capture a first-order market effect on our three different types of manipulation incentives, we develop the following OLS multivariate model that regresses the value of discretionary accruals on a 0–1 dichotomous variable (PUBLIC) that captures the private/public status of the firm.

$$\frac{DA_{it}}{A_{i,t-1}} = \gamma_1 + \gamma_2 \text{PUBLIC}_{it} + \gamma_3 \frac{\text{SIZE}_{it}}{A_{i,t-1}} + \gamma_4 \frac{\text{LEV}_{it}}{A_{i,t-1}} \\ + \gamma_5 \frac{\text{GROWTH}_{it}}{A_{i,t-1}} + \gamma_6 \frac{\text{ROA}_{it}}{A_{i,t-1}} + \varepsilon_{it}$$

For the test of H1, discretionary accruals (DA) are taken at absolute value because the income-smoothing action and not the direction of manipulation is the important point of study. Results are presented for each of the target distance intervals (20%, 10% and 5%) that we use to confine the boundaries of what is considered real income smoothing. Assuming that the narrower the range, the better the definition of smoothing, a tendency

¹² These sampling criteria give us a final sample of 79,511 firm-year observations, varying from a minimum of 8,419 in 1996 to a maximum of 14,183 in 2002. The sample is trimmed to exclude the 1% of the observations with the highest and lowest values of some variables, depending on the model estimated.

in the coefficient should be observed along the three intervals in the test of our first hypothesis. For H2 and H3, that is, for increasing (decreasing) incentives other than smoothing, discretionary accruals are, logically, regressed at the signed value.

Several additional variables are introduced to control for firm characteristics for which prior research suggests an association with earnings-management levels. The effect of SIZE

Table 1
Descriptive statistics of the test and control variables for below/above-target firms

	Mean	SD	p.25	Median	p.75	N	t-statistic (p-value)
Panel A: Distributional statistics and univariate differences between public/private firms whose pre-managed earnings are above last year's earnings (all above-target firms)							
<i>DA</i>							
Public	-0.084	0.103	0.114	0.060	0.023	312	3.832
Private	-0.114	0.139	-0.158	-0.079	-0.030	17,086	(0.000)***
<i>LEV</i>							
Public	0.570	0.261	0.370	0.570	0.770	312	9.056
Private	0.711	0.274	0.530	0.760	0.950	17,086	(0.000)***
<i>GROWTH</i>							
Public	0.076	0.286	-0.035	0.063	0.168	312	1.719
Private	0.103	0.273	0.008	0.090	0.213	17,086	(0.085)
<i>SIZE</i>							
Public	4.824	0.899	4.240	4.816	5.396	312	16.393
Private	4.174	0.690	3.780	4.142	4.547	17,086	(0.000)***
<i>ROA</i>							
Public	0.063	0.054	0.034	0.052	0.081	312	0.848
Private	0.060	0.075	0.029	0.054	0.085	17,086	(0.396)
Panel B: Distributional statistics and univariate differences between public/private firms whose pre-managed earnings are below last year's earnings (all below-target firms)							
<i>DA</i>							
Public	0.085	0.118	0.021	0.050	0.105	370	5.197
Private	0.133	0.178	0.026	0.077	0.182	17,530	(0.000)***
<i>LEV</i>							
Public	0.587	0.254	0.410	0.580	0.770	370	10.41
Private	0.731	0.262	0.560	0.790	0.960	17,530	(0.000)***
<i>GROWTH</i>							
Public	0.047	0.243	0.024	0.061	0.151	370	0.820
Private	0.060	0.312	-0.054	0.067	0.200	17,530	(0.412)
<i>SIZE</i>							
Public	4.922	0.900	4.394	4.966	5.491	370	22.88
Private	4.090	0.687	3.706	4.095	4.487	17,530	(0.000)***
<i>ROA</i>							
Public	0.052	0.063	0.026	0.046	0.070	370	4.65
Private	0.032	0.084	0.005	0.034	0.064	17,530	(0.000)***

The initial sample comprises 46,131 industry-level observations for the period 1996–2002. The sample is trimmed to exclude extreme values of absolute discretionary accruals (scaled by lagged total assets) greater than one.

Definition of variables: *DA*, signed discretionary accruals obtained using the Modified Jones model, scaled by lagged total assets; *LEV*, financial leverage measured as the ratio of total debt to total assets; *GROWTH*, annual increase in sales; *SIZE*, logarithm of revenues for the fiscal year; *ROA*, pre-managed ordinary income calculated as reported ordinary income minus discretionary accruals obtained from the Accounting Process model, scaled by lagged total assets.

***Significant at the 0.01 level (p -value < 0.01).

is controlled for by using the logarithm of revenues for the fiscal year. Political cost hypotheses suggest that large firms are more controlled by the public and government, so it is to be expected that they will engage less in earnings-management practices (Moses, 1987). We include a financial-leverage variable (LEV = total debt to total assets), since access to different corporate financing alternatives depends on agency costs and asymmetric information (Rajan & Zingales, 1995). GROWTH is defined as the annual increase in revenues and we expect it to increase the level of total accruals and, hence, the possibilities of manipulation. ROA is pre-managed yearly return on assets measured by ordinary income minus tax and discretionary accruals. We choose pre-managed instead of reported earnings because a *pre*- and not a *post*-reference is the one driving manipulation forces. In order to avoid correlation derived from the use of the same accrual measure for both the dependent and independent sides of the model (backing-out problem, Lim & Lustgarten, 1998), we obtain discretionary accruals from an alternative earnings-management model (Accounting Process, Garza-Gómez, Okumura, & Kunimura, 1999) when creating this proxy for pre-managed earnings as a control variable in the model.

Expected relations for each of these control variables will differ depending on each of the three hypotheses, so we will consider them in the interpretation of our results.

4.5. Descriptive statistics

Table 1 presents descriptive statistics for above (below) target observations in public and private firms and a *t*-test for mean differences between the two groups. Supporting the broad vision of the income-smoothing definition and similar to Dechow and Park (1997) and Gull de Albornoz and Alcarria (2003), discretionary accruals are overwhelmingly negative for the above-target group (percentile 75 is -0.023 and -0.030 for public private firms, respectively, panel A) and positive for below-target firms (percentile 25 is 0.021 and 0.026 for public private, respectively, panel B). We can also observe that all public firms are significantly greater in size and less leveraged than private ones, but significant differences in profitability are only found for below-target firms. No differences are found in their growth levels.

Table 2 presents additional descriptive statistics of discretionary accruals for *all above* and *all below*-target firms (panel A) and for *smoothers*, *above-target non-smoothers* and *below target non-smoothers* (panels B, C and D) for each of the target intervals used in our definition of income smoothing. We also present a *t*-statistic that tests whether discretionary accruals are significantly different from zero.

We can observe that similar values of discretionary accruals are found in all distributions, denoting the existence of important levels of manipulation (in all cases significantly different from zero) throughout all the panels of the table. This is a sign that manipulation actions (other than smoothing) are taken in both the increasing and decreasing sense by Spanish companies.

The last row in each section of the table (*Alt. smoothing measure*) presents values for the cross sectional ratio of the standard deviation of ordinary income (ROA) over the standard deviation of operating cash flow (OCF), which we present as an alternative measure of income smoothing. The lowest values found in the smoothers' part of the table (0.425 , 0.430 , and 0.411 , panel B) support our restricted approach as a more adequate vision of income smoothing.

Table 2

Descriptive statistics on discretionary accruals

		All above target	All below target	
Panel A. Distributional statistics and <i>t</i> -test of discretionary accruals for those firms whose pre-managed earnings are above/below last year's earnings				
DA (signed value)	Percentile 25	-0.157	0.026	
	Percentile 50	-0.078	0.076	
	Percentile 75	0.030	0.180	
	<i>t</i> -statistic (<i>p</i> -value)	(0.000)***	(0.000)***	
	N	17,398	17,900	
Alt. smoothing measure		0.628	0.492	
Panel B. Distributional statistics and <i>t</i> -test of discretionary accruals for income smoothers				
		Target interval = 20%	Target interval = 10%	Target interval = 5%
DA (absolute value)	Percentile 25	0.030	0.031	0.030
	Percentile 50	0.071	0.070	0.070
	Percentile 75	0.142	0.138	0.138
	<i>t</i> -statistic (<i>p</i> -value)	(0.000)***	(0.000)***	(0.000)***
	N	7094	3759	1896
Alt. smoothing measure		0.425	0.430	0.411
Panel C. Distributional statistics and <i>t</i> -test of discretionary accruals for above-target non-smoothers				
		Target interval = 20%	Target interval = 10%	Target interval = 5%
DA (signed value)	Percentile 25	-0.162	0.159	0.158
	Percentile 50	0.079	-0.079	-0.079
	Percentile 75	0.029	-0.029	0.029
	<i>t</i> -statistic (<i>p</i> -value)	(0.000)***	(0.000)***	(0.000)***
	N	13,861	15,477	16,427
Alt. smoothing measure		0.628	0.630	0.627
Panel D. Distributional statistics and <i>t</i> -test of discretionary accruals for below-target non-smoothers				
		Target interval = 20%	Target interval = 10%	Target interval = 5%
DA (signed value)	Percentile 25	0.025	0.025	0.026
	Percentile 50	0.079	0.078	0.077
	Percentile 75	0.190	0.185	0.183
	<i>t</i> -statistic (<i>p</i> -value)	(0.000)***	(0.000)***	(0.000)***
	N	14,330	16,046	16,992
Alt. smoothing measure		0.489	0.490	0.491

The initial sample comprises 46,131 industry-level observations for the period 1996–2002. The sample is trimmed to exclude extreme values of absolute discretionary accruals (scaled by lagged total assets) greater than one. DA: discretionary accruals obtained using the Modified-Jones model, scaled by lagged total assets.

Alt. smoothing measure: alternative smoothing measure, calculated as the standard deviation of return on assets (ROA) divided by the standard deviation of Operating Cash Flow (OCF).

The *t*-statistic tests the null hypothesis that the mean of DA is equal to zero.

***Significant at the 0.01 level (*p*-value < 0.01).

Income smoothers are firm-year observations whose post-managed earnings lie inside intervals of 20%, 10% and 5% around last year's earnings.

Above- and below-target non-smoothers are firm-year observations whose post-managed earnings lie outside intervals of 20%, 10% or 5% around last year's earnings.

5. Results

5.1. Results for the income-smoothing hypothesis (H1)

Table 3 presents multivariate results for each around-target interval (20%, 10% and 5%) that we use in our definition of income smoothing. The coefficient of the PUBLIC variable is, in all cases, negative but never significant, and its value decreases with the range of variability (*p*-value 0.092, 0.382 and 0.552 for the 20%, 10% and 5% intervals, respectively). So, the stricter the definition of income smoothing, the more we tend to reject that a difference exists between public and private companies (Hypothesis 1). These results denote that, for private firms, the pressure from stakeholders to stabilize earnings is not significantly different to that derived from bank regulation and analysts' perception of stability in the public case. The tendency found across the three intervals supports the need to differentiate smoothing from other incentives in the testing of our hypotheses. Results for this type of income-smoothing actions cannot be compared with the Belgian case because they only show results for the increasing and decreasing hypotheses. However, and as an alternative, we separately analyze above/below-target firms that lie inside our limits of income smoothing and find that, contrary to the Belgian study, no differences appear in the decreasing sense.

Table 3
Multivariate regression of absolute discretionary accruals on PUBLIC and control variables for different levels of income smoothers

$$DA = \alpha_0 + \alpha_1PUBLIC + \alpha_2LEV + \alpha_3GROWTH + \alpha_4SIZE + \alpha_5ROA + \epsilon$$

Variable	Target interval=20%				Target interval=10%			Target interval=5%		
	e.s.	Coefficients estimate	t-statistic	p-value	Coefficients estimate	t-statistic	p-value	Coefficients estimate	t-statistic	p-value
Intercept		0.147	13.810	0.000	0.138	9.684	0.000	0.126	6.189	0.000
PUBLIC	–	0.015	1.687	0.092	–0.010	–0.875	0.382	–0.010	–0.594	0.552
LEV	+	0.056	10.097	0.000	0.065	8.694	0.000	0.058	5.490	0.000
GROWTH	+	0.037	5.052	0.000	0.039	3.825	0.000	0.020	1.338	0.181
SIZE	–	–0.013	–5.342	0.000	–0.013	–3.984	0.000	–0.007	–1.611	0.107
ROA	–	0.288	–12.145	0.000	0.259	–7.927	0.000	0.316	6.564	0.000
R ²		0.046			0.047			0.043		
N		7094			3759			1896		

The table shows pooled estimation coefficients. The initial sample comprises 46,131 industry-level observations for the period 1996–2002. The sample is trimmed to exclude extreme values of absolute discretionary accruals (scaled by lagged total assets) greater than one.
Definition of variables: DA= absolute discretionary accruals obtained using the Modified Jones model scaled by lagged total assets; PUBLIC= dichotomous variable that takes value one for public firms, zero otherwise; LEV= financial leverage measured as the ratio of total debt to total assets; GROWTH= annual increase in sales; SIZE= logarithm of revenues for the fiscal year; ROA= pre-managed ordinary income calculated as reported ordinary income minus discretionary accruals obtained from the Accounting Process model, scaled by lagged total assets. Income smoothers are firm-year observations whose post-managed earnings lie inside intervals of 20%, 10% and 5% around last year's earnings.
e.s.= expected sign

Control variables present significant coefficients that are clearly in line with expectations except for pre-managed ROA, for which, as a consequence of taking discretionary accruals at absolute value, both positive and negative signs would be justified.

5.2. Results for below-target non-smoothers (H2)

Table 4, panel A, presents multivariate results for below-target firms lying outside each of the three intervals of income smoothing. We find that the PUBLIC sign is negative (private firms tend to manage more) but never significant (p -value 0.645, 0.834 and 0.962

Table 4
Multivariate regression of signed discretionary accruals on PUBLIC and control variables for above/below-target firms that do not engage in income smoothing

$$DA = \gamma_0 + \gamma_1 \text{PUBLIC} + \gamma_2 \text{LEV} + \gamma_3 \text{GROWTH} + \gamma_4 \text{SIZE} + \gamma_5 \text{ROA} + e$$

Variable	e.s.	Out of target (interval = 20%)			Out of target (interval = 10%)			Out of target (interval = 5%)		
		Coefficients estimate	t-statistic	p-value	Coefficients estimate	t-statistic	p-value	Coefficients estimate	t-statistic	p-value
Panel A. Below-target non-smoothers										
Intercept		0.239	26.287	0.000	0.235	27.735	0.000	0.232	28.086	0.000
PUBLIC		-0.004	0.342	0.645	-0.002	-0.210	0.834	0.000	-0.048	0.962
LEV	+	0.058	10.678	0.000	0.053	10.768	0.000	0.057	11.764	0.000
GROWTH	+	0.030	3.510	0.000	0.015	3.689	0.000	0.016	4.012	0.000
SIZE		0.015	14.878	0.001	0.028	-14.747	0.000	-0.028	-15.194	0.000
ROA		-0.871	-53.617	0.000	-0.882	-57.783	0.000	-0.815	-57.217	0.000
R ²	0.203				0.207			0.197		
N	14,330				16,046			16,992		
Panel B. Above-target non-smoothers										
Intercept		-0.033	4.402	0.000	-0.040	5.670	0.000	-0.042	-6.131	0.000
PUBLIC	+	0.014	1.544	0.123	0.017	2.008	0.045	0.018	2.251	0.024
LEV		-0.087	20.595	0.000	-0.087	-22.184	0.000	-0.087	-23.125	0.000
GROWTH	+	0.022	5.591	0.000	0.019	4.923	0.000	0.016	4.343	0.000
SIZE	+	0.003	1.945	0.052	0.005	3.521	0.000	0.006	3.982	0.000
ROA		0.666	-44.609	0.000	0.659	-46.678	0.000	-0.638	-46.868	0.000
R ²	0.138				0.136			0.131		
N	13,861				15,477			16,427		

The table shows pooled estimation coefficients. The initial sample comprises 46,131 industry-level observations for the period 1996–2002. The sample is trimmed to exclude extreme values of absolute discretionary accruals (scaled by lagged total assets) greater than one.

Definition of variables: DA, discretionary accruals obtained using the Modified-Jones model scaled by lagged total assets; PUBLIC, dichotomous variable that takes value one for public firms, zero otherwise; LEV, financial leverage measured as the ratio of total debt to total assets; GROWTH, annual increase in sales; SIZE, logarithm of revenues for the fiscal year; ROA, pre-managed ordinary income obtained as reported ordinary income minus discretionary accruals obtained from the Accounting Process model, scaled by lagged total assets.

Above and below-target non-smoothers are firm-year observations whose post-managed earnings lie outside intervals of 20%, 10% or 5% around last year's earnings.

e.s. = expected sign

for the 20%, 10% and 5% intervals, respectively). An interval effect is also observed because the greater the non-smoothing area (the better-defined smoothing is), the less significant the PUBLIC coefficient is, leading us to reject a first-order market effect on income increasing (other than smoothing) practices in Spain (H2). Lower pressure, typical of code-law countries, together with the higher supervision and control inherent to public companies, do not permit us to ratify, as expected, the differences in income increasing usually found in Anglo-Saxon countries. Our results extend the less-pronounced influence of the market on income-increasing practices found for Belgian companies by Vander Bauwhede et al. (2003) to the Spanish case. It seems, then, that neither the level of concentration nor the type of blockholder (banking vs. non-banking) is strong enough to affect income-increasing results between these two European countries.

Our Spanish results, nevertheless, show no differences between public and private companies but not an absence of income-increasing practices, as we have previously seen in Table 2. We extend the double (income decreasing and income smoothing) vision of manipulation practices that had been proposed for code-law countries by García Lara et al. (2005, 2006) and find that private and public companies engage in income-increasing practices in Spain. In the private case, this is because their higher dependence on bank creditors forces them to increase reported numbers in order to fulfil the contractual outcomes that depend on them (especially necessary for low-earning firms). In the public case, and although less pronounced, some kind of market pressure still seems to prevail in Spain.

As regards the control variables, a positive sign is consistent with a situation in which leveraged and growing firms are practicing significantly more income increasing and a negative sign with one in which firms with higher levels of pre-managed profitability need fewer income-increasing practices. A negative sign is found for size, which is consistent with expectations, except for the 20% interval.

5.3. Results for above-target non-smoothers (H3)

Similar multivariate results are presented in panel B (Table 4) for above-target non-smoothers in each of the target intervals. Coefficients show that, in this case (above last year's reference), earnings are a less relevant signalling device for private firms as is reflected by the positive sign of the PUBLIC variable (fewer negative values of signed DA in public companies). This is significant at the standard levels in two of the intervals (p -value 0.123, 0.045 and 0.024 for the 20%, 10% and 5% intervals, respectively).

These results are consistent with a situation where market forces are providing a counterweight to the influence of manipulation incentives in code-law countries, as Burgstahler et al. (2006) propose, but where their effect is limited to income-decreasing practices. The results are also in line with the Belgian case. Although they justify their income-decreasing differences on wage-increase demands from employees and higher taxation being consequences of high reported earnings in private firms, we propose an alternative explanation that could also make sense and help us to better understand the results for the Spanish case. Our argument is that the difference might be more related to the lower dependence of bank-dominated companies on income-decreasing practices to justify outsider expropriation. Public firms would achieve this aim more effectively through real

activities in the relationship between the bank and the firm, which would result in higher interest rates and commission costs.

Our results would, nevertheless, also support differences either in tax-decreasing incentives or in tax-decreasing mechanisms. A good way to analyze which of these two alternatives is prevailing for public firms would be through the level of *deferred taxes* on the balance sheet (Cloyd, Pratt, & Stock, 1996; Lev & Nissim, 2002; Erickson, Nalón, & Maydew, 2004; Holland & Jackson, 2004; Hanlon, 2005), a line which we leave for future extensions.

The fact that the PUBLIC variable gains significance with the restriction of the smoothing definition (interval) ratifies the need, pointed out by García Lara et al. (2006) and Bao and Bao (2004), to analyze the effects of different incentives (i.e., smoothers vs. other non-smoothers) separately. Otherwise, we could be making erroneous inferences. Whereas in our study no differences have been found in real smoothing practices of above-target firms while differences exist in the non-smoothing income-decreasing area, in the Belgian study, results for both situations were presented as a joint *above-target-smoothing* difference.

Control variables are again in line with expectations. The negative sign shows that more leveraged firms practice more manipulation but a positive sign is found in growth and size. Finally, the negative significant coefficient found for ROA shows that pre-managed profitable firms engage in more income-decreasing practices (signed DA) with payout or expropriation intentions.

5.4. Robustness tests

5.4.1. Differences within the market. The relevance of the Ibex 35 index

The different size distribution of each type of firm (public firms tend to be larger than private ones, see Table 1) might also be influencing our results. To better control for this effect, we create three sub-samples based on total assets (small, medium-sized and large). A difference emerges for below-target (income increasing) non-smoothers in the group of largest companies. Large public firms show significantly lower levels of discretionary accruals, in line with the first-order market effect proposed by Burgstahler et al. (2006), which was previously found only for income decreasers. This leads us to think that for the largest and most relevant public companies (those included in the Ibex 35 Spanish index out of a total of 150 listed firms) supervision is stronger than pressure and a different behavior is found. Membership in such type of indexes gives a special status to the firm, considerably reducing their possibilities for manipulation.¹³ This has been ratified by the fact that, comparing the large vs. small sub-samples inside the public group of companies, in all cases (income smoothing, increasing and decreasing), significantly lower levels of manipulation were found for the largest (indexed) listed group. This differentiation between indexed vs. non-indexed public companies might also be relevant in similar small markets in other

¹³ Spanish Inditex is a good example of the market giving preference to supervision over pressure for firms belonging to the Ibex 35 index. Reported earnings for the first semester 2003 showed an increase of 21%. Despite that, figures were not in accordance with analysts' perspectives and stock prices fell 12%. Obviously, it does not seem that the firm engaged in income-increasing actions to stay just below expectations.

code-law countries and is an interesting topic to study in greater depth as a future line of research.

5.4.2. *Other robustness checks*

Our basic results in Tables 3 and 4 could be influenced by several methodological factors, so in this section we perform additional analyses to assess their robustness. We have maintained a similar structure as in previous annual-smoothing papers (DeFond & Park, 1997; Gill de Albornoz & Alcarria, 2003; Vander Bauwhede et al., 2003), using pre-managed earnings as the partitioning variable to classify observations as above (below) target. However, this procedure could lead to biases because a mechanical association with our dependent variable (discretionary accruals) could be conditioning the increasing decreasing actions found in the sub-samples used for the test of H2 and H3. In the case of H1 (real smoothing purposes), as we use reported (post-managed) earnings to select smoothing firms, this is not a problem.

Even though our main concern was not to demonstrate the type of actions (increasing, decreasing) engaged in by above below-target firms, we have re-estimated the regressions in Table 4 using all non-smoother increasing decreasing observations, independently of their previous below above-target status. Inferences are robust to this change.

Our sample period is very wide, so we are concerned that differences in macroeconomic stability might affect our inferences. Albrecht and Richardson (1990) state that conclusions about income smoothing might differ if we choose different periods of time. Although the Spanish economy was quite stable (with only moderate increases) during the period under study (1996–2002), the regressions have been re-estimated for sub-periods 1996–97, 1998–99 and 2000–02. The results are not sensitive to this kind of period stratification.

Taking into account that the Jones model used to estimate our discretionary-accruals measure has been shown to suffer from possible specification problems (Young, 1999; McNichols, 2000; Thomas & Zhang, 2000; Kothari, Leone, & Wasley, 2005, etc.), we have repeated the analyses using two alternative earnings-management models frequently cited in the literature: the Cash Flow model (Jeter & Shivakumar, 1999) and the Accounting Process model (Garza-Gómez et al., 1999). Their use gives results that are robust and consistent with those previously obtained using the Jones model.

Finally, we carry out a test to control for a possible correlation problem between our dependent variable and pre-managed ROA as a control variable in our multivariate model but, as we pointed out in Section 4, the correlation coefficient is within the standard levels of acceptance. We also re-run the main regression using reported (post-managed) earnings as the proxy for profitability levels but it does not affect the sign and significance of our PUBLIC variable. This new proxy, nevertheless, presents a positive sign, which makes sense considering the effects of the manipulative actions themselves.

6. Summary and conclusions

In this paper we have tested whether a difference exists in the earnings quality of public vs. private firms in Spain. The public private debate is interesting in a code-law country like this because, although most firms are privately held, public companies face important social and political pressure and the presence of banks as their main blockholders affects their

information asymmetries very differently. The fact that recent papers (García Lara et al., 2005, 2006; Leuz et al., 2003) have shown that certain types of practices (income smoothing and income decreasing) are more typical of code-law countries redirects the analysis towards a wider variety of incentives than those (almost exclusively related to income increasing) discussed in the United States case.

We have built on Vander Bauwhede et al. (2003), the only paper that has published results on the public/private manipulation debate in a similar European context (Belgium), and we have tried to test for the effect of institutional differences between these two countries. The Belgian study fails to separate income smoothing from income increasing and decreasing (their vision of smoothing is based solely on the fact that income increasing/decreasing is practiced by the majority of below/above-target firms), so they do not carry out a test of the conflict in a real smoothing scenario. Our study includes such a test by proposing an alternative methodology that defines the smoothing area more precisely under the argument that not all above/below-target companies necessarily have earnings-stabilizing intentions. We then formulate separate hypotheses for three (and not only two) different manipulation scenarios: *income smoothing*, *income increasing* and *income decreasing*.

We have not found significant differences between public and private smoothers, confirming that outsider pressure on private firms to stabilize their earnings is similar to that found in public firms. The latter are clearly influenced by banking regulation that penalizes their income volatility and that of their subsidiaries.

Our results also reject the existence of differences in the income-increasing practices. The higher dependence of private firms on banks as creditors forces them to increase reported numbers to fulfil contractual outcomes. For public firms, some kind of market pressure, although less pronounced than in the United States, still prevails to maintain earnings levels in Spain. Although the Belgian study also fails to find income-increasing differences (which they attribute to lower market pressure in Belgium than in the United States), we further replicate our analysis by sub-periods and by sizes and find that, when dealing with only very large companies, lower levels of upwards manipulation are found for the public group. This shows that the cost-benefit of manipulation is, for the most relevant listed Spanish companies (those included in the Ibex 35 Spanish index out of a total of 150 listed firms), clearly influenced by stricter scrutiny and higher reputation costs.

As regards income-decreasing actions, higher levels are clearly associated with private companies, in line with the results presented for the Belgian case, which they attribute to wage-increase demands from employees and higher taxation as a consequence of reporting high profits. Accepting expropriation of outsiders as a widespread managerial practice in Spain, we propose an alternative explanation based on the fact that public firms achieve this aim through real activities in their relationship with the bank, resulting in a much lower need to engage in income-decreasing practices.

Institutional differences in the degree of ownership concentration and in the public control of banks between Belgium and Spain do not seem to significantly affect the income-increasing or decreasing results, but do help us to find alternative and more reasonable explanations.

We have also found a different behavior within the public group, highlighting the relevance of the limited group of listed companies that compose specific public indexes in

some European markets like the Spanish one. Contrary to what happens in the United States case, the supervision factor seems to be more important than market pressure for these relevant indexed companies, leading to lower manipulation levels than for other firms. This stratifying behavior within listed firms had not been tested before.

Our results are robust to several sensitivity tests but should be taken with caution for several reasons. First, it will be necessary to look for more specific incentives or accruals that could reflect the effects of earnings manipulation more precisely. One of the most important incentives for public firms, impossible to compare with the private group, would be that of firms meeting or beating analysts' forecasts. Second, data could also be influenced by the goodness of the discretionary-accruals model applied. We should never forget the need to continue estimating better models for each context and group of firms.

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Book Review Section

The book review section is interested in works published in any language, as long as they are comparative or international in character. The author or publisher of such works should furnish the book review editor with two (2) copies of the work, including information about its price and the address where readers may write for copies. Reviews will be assigned by the book review editor. No unsolicited reviews will be accepted. Suggestions of works that might be reviewed are welcomed.

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Book reviews

Business Research Methods, Boris Blumberg, Donald R. Cooper, Pamela S. Schindler, McGraw-Hill, Maidenhead, UK(2005), xv+ 596 pages+ CD with 281 pages, £34.00, £54.19, ISBN-10: 007710742X

This book is Boris Blumberg's European version of *Business Research Methods* by Donald R. Cooper and Pamela S. Schindler, which was in its eighth United States edition when this European version was created. Whilst Blumberg is primarily associated with universities in the Netherlands, his examples are drawn throughout Europe. As well as the 596 pages of text, the book comes with a CD containing a further 281 pages relating to statistical analysis. Interested readers can consult the comprehensive web site, for both students and lecturers, which contains information on all the chapters plus nine sets of resources for students and eight for lecturers (www.mcgraw-hill.co.uk/textbooks/blumberg).

The first question that such a book presents to the reviewer is why a European edition is necessary. I have not seen the original United States book, but Blumberg's version makes the following claim:

"The current text is more than just an adaptation of the original text, however. It contains completely new chapters, as well as substantially rewritten and rearranged chapters. Moreover, 25 new exhibits have been added to clarify issues discussed and new data sets are provided on the accompanying CD-ROM to reflect the European and international examples used in the book" (p. viii).

I am not sure that creating a hybrid like this is necessarily the best solution, as it has never bothered me whether a textbook was a United States one provided the principles being expounded were equally applicable in the United Kingdom. This is not always true of books that reflect the institutional and regulatory bodies in the United States, but in the case of a book on research methods, I am not sure that there is much to be gained by creating a European equivalent, since research methods are universal. In the introduction, there is a sense that Blumberg has attempted to soften the positivism of the United States original and also to focus more on students and academic research instead of the original focus of the United States text on "research conducted or sponsored by companies" (p. viii). However, this is only partly successful, because the text is still primarily aimed at management students who might be expected to need to understand how to conduct or commission research once they are in senior management positions. Hence, I would not see this as a text book for students pursuing a research career in academia.

The book consists of 13 chapters with an additional five on the CD-Rom. The book chapters are grouped into three areas: essentials of research, research approaches, and

conducting the research. Under the heading essentials of research, there are three chapters: the nature of business and management research (Ch. 1), the research process and proposal (Ch. 2) and ethics in business research (Ch. 3). There is no discussion of the philosophy of science, which one might have expected in this section. Thomas Kuhn gets a mention, but only in relation to "why scientists attack their problems with such passion and devotion" (p. 26). This omission is presumably because the primary focus of the book is on using research in a business environment rather than within an academic one. In this respect the book is much more of a practical guide on how to undertake business research, without much theorizing about the nature of the research process and its purpose. Chapter 1 contains a section on the differences between positivism and interpretivism (with realism being characterized as somewhere in-between) and a discussion of the difference between induction and deduction, but little else. Chapter 2 on the research process and proposal further reveals that the main objective of the book is to provide guidance to managers on how to use research. A management research question hierarchy is described as follows: (1) research dilemma, (2) management question, (3) research question, (4) investigative questions, (5) measurement questions and (6) decision. The second half of this chapter deals with the research proposal, which it is assumed is an individual's or company's offer to produce a product or render a service to a potential buyer or sponsor. Within the proposal, it is envisaged that there will be a section on the importance and or benefits of the study. The book says that "this section also requires you to understand what is most troubling to your sponsor" (p. 77) and the clear pedagogic message is that sponsored research is designed to meet the needs of the sponsor rather than producing benefits for the greater good. Chapter 3 looks at the ethics of business research and makes some sensible comments about the ethical treatment of participants, including how deception can be used ethically. Given the focus of the book, the section on potential ethical conflicts between the researcher and the sponsor is too short. The issue of the sponsor asking for unethical research is broached, but not discussed in sufficient detail to help potential researchers resolve such awkward situations. Given that the potential ethical conflicts between researchers and sponsors is a key problem, it would have been worthy of much more discussion, with at least one case study of how such a problem has arisen in the past and how the researcher chose to act in accordance with his or her conscience.

The second section on research approaches has six chapters. Chapter 4 discusses the differences between quantitative and qualitative research and provides a useful taxonomy of the different ways of conducting research. Chapter 5 looks at the literature review process, providing a useful overview of the objectives of such a review, together with how to judge what a "good" literature review is. The last part of this chapter is very helpful and explains how to search for a subject in the databases available. The book is strongest in the subsequent chapters explaining how to do research from sampling (Ch. 6), survey research (Ch. 7), observational, action and ethnographic research (Ch. 8) and experimentation (Ch. 9). These chapters give a good description of the approaches and I would imagine would be very helpful for students. Section 3 is equally good at describing how to conduct research with chapters on: secondary data (Ch 10), measurement and scales (Ch. 11), fieldwork – questionnaires and responses (Ch. 12) and writing up and presenting research outcomes (Ch. 13). Again these chapters would give students a good idea of how to undertake research and they contain many practical tips. Chapter 13 in particular has lots of

handy hints about presenting the results of the research in a way that is interesting to a busy audience. I think that many people would gain much from reading this chapter, for as the final sentence says "Good presentations add lustre to both the research and the reputation of the researcher" (p. 505). My only quibble is that there is nothing on the academic publishing process. This is such an important topic for would-be academics that some summaries of the large literature on the subject would have been very useful as the final act of the research process.

The CD-Rom looks to have been a missed opportunity. Initially, I thought that it would have some form of interactive material on it so that students could play around with real data etc. Instead, it looks as if someone has looked at the book with a fourth section containing the five chapters on statistics and decided that this would make the book too heavy and simply prepared PDF files of the chapters in exactly the same format as the rest of the book. Personally I have difficulty reading material from a computer screen and so I would have to print out these chapters. This is also necessary on the odd occasion when the landscape setting is used as otherwise the reader would have to angle his or her head at 45 degrees trying to read the screen. The statistical section looks to be competently done, but whether it would be sufficient I am not so sure. Given the large number of introductory statistics books available, the CD is unlikely to be used as a primary source, particularly as the printed version is bulky. One curiosity occurs in Chapter 17, where one of the examples uses the currency of French Francs to discuss the effects of average growing temperature on the price of Bordeaux wine. In these post-euro days seeing French Francs again was like a trip down memory lane!

To what extent readers of the book will consult the web site is an open question. The student site contains some useful material, particularly the excel data sheets relating to cases in the book, which would allow students to practice analyzing real data. There are also some interesting case studies that could be used in workshops. I am less clear of the usefulness of the web-links resource as I would have thought most people would use Google or its equivalent. The multiple-choice quizzes might be of interest, although some of the distracters are less than convincing. The crosswords look too sketchy for crossword enthusiasts and I cannot see them being used much. The password-protected web site for lecturers contains some useful material. There are plain PowerPoint slides and PowerPoint "artwork" slides for each chapter that contain many useful diagrams that can be used to make a lecture more interesting. There are notes on the case studies contained in the student section plus three different types of question and answers (multiple choice, short questions and essay questions). These could all be of use to a time-pressured lecturer.

My overall feeling after reading the book is that it is very strong on the practicalities of undertaking research and presenting the results. It would be a strong contender as a course book for a business research module in an MBA program. However, I miss the more academic side of undertaking research, such as reflecting on the philosophy of research and the need to publish the results to a wide audience via international research journals. For this reason, I would not see the book being used in master's in management programs that have aspirations of producing future Ph Doctorate students. The back cover of the book talks of its "unrivalled coverage of the ethical and philosophical dimensions of research," but I did not detect much of this. I suspect that this might be Blumberg's

preferred way of teaching business research, but that he was too constrained by having to adapt the existing United States text.

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Best Practice in Corporate Governance: Building Reputation and Sustainable Success, Adrian Davies, Gower Publishing Limited, Aldershot, Hants, England (2006), xiv+ 165 pages, £55.00, US\$99.95, £81.54, ISBN: 0 566 08566 6

Corporate Governance is an essential aspect for anyone concerned with the company's sustainable growth. This book is devoted to identifying the key factors of good governance, and eventually the best practices. It relies on practical experiences, interviews and numerous real cases – which are mainly related to United Kingdom settings – analyzed in depth. The author points out regularly throughout the chapters several specific characteristics that emerge from its analysis of the different cases. And, notwithstanding the necessary need to implement the different recommendations from reports especially for the board of directors (such as the Cadbury Report), the relationships with stakeholders, managers' personal values and leadership style seem to be also key elements of good corporate governance.

Besides the appendixes, the book has nine chapters divided in two main parts. The first part ("Organizing for Effective Governance") encompasses four chapters that set what the author considers the main attributes of corporate governance, whilst the second part is devoted to "Different Models of Corporate Governance," in the five last chapters.

After a brief overview of the Corporate Governance (hereafter CG) genesis in the United Kingdom, Chapter 1 emphasizes the need to integrate different stakeholders in the analysis. The main stakeholders identified – i.e. shareholders, the board of directors, customers, employees, suppliers, community and the government – are cautiously introduced as the "interplay of these stakeholders is the theme of this book" (p. 6). The main dimensions of CG are then presented.

Chapter 2 discusses the advantages and disadvantages of the distinct approaches CG models may have, such as rules-based models (e.g., the Cadbury Report) vs. other more interacting models. In doing so, it exhibits the main features of different governance regimes (i.e. United States of America, Japan, France, Germany, The Netherlands, Italy, Spain, Switzerland, Russia, Canada, Australia, New Zealand, South Africa and China). A micro perspective then emphasizes the main functions (Finance, Communication, etc.) within a company that concern CG and the role they may play within CG.

Chapter 3 focuses on leadership, an attribute that should be taken with attention when considering effective CG. It proposes a typology of five leadership styles, i.e., heroic, crisis, collegiate, servant, and transformational, and how these styles may impact CG. The

underlying idea is that leadership may facilitate good CG. Hence, the main characteristics of a good leader are discussed.

Chapter 4 details and defines the key dimensions of CG (i.e., leadership, culture, structure, processes, and brand of a company). An analysis of the implementation of CG within the dimensions is also provided, and how they should be integrated within a CG model to be effective.

Chapter 5 begins the second part of the book by providing a description of five real cases — i.e., *The Carphone Warehouse*, *Cobra Beer*, *Diageo*, *Scottish and Southern Energy*, *BP Amoco* — that serve as illustrations of different company models. The cases selected are generally well presented, with a good description of their activities following the history of the company, and propose diversified views of CG models (different industries, countries). Depending on the case studied, some key attributes are identified such as *leadership*, *responsible behavior*, *trust* between stakeholders, *integrity* or particular *values* from the founder of *Cobra Beer*; for example. The author provides a plus with the *BP Amoco* case, in the sense it offers paragraphs that propose discussions on specific issues of governance that BP Amoco faced, and “Implications for the future role of the Board.”

Chapter 6 focuses on the specificities of family companies and entrepreneurs in terms of CG. The two types of company models are analyzed separately. Thus, besides financing issues, the needs for leadership (i.e., from the founder of the company) but also trust among stakeholders seem to be the key features of governance for entrepreneurs. Contrary to the previous chapter, a broader analysis is provided. Several principles of good CG (from the *Nolan Committee*) are compared with the characteristics of entrepreneurs. It emphasizes the difficulty of implementing those principles to entrepreneurship. Hence, and although a new CG approach is proposed for such a company model, which should lead stakeholders to support the entrepreneur as well as prompt him to share power, neither precise nor detailed solutions are given. The second part of the chapter is devoted to family business. The difficulties of governing such businesses are tackled. It emerges that the Board needs to be more open to external directors (i.e., non-family members).

Chapter 7 emphasizes the need for companies to integrate, into their CG approach, the impacts of social responsibility. A case based on *Business in the Community*, as well as the Corporate Responsibility Index, illustrates this growing trend in CG. Throughout the chapter, corporate responsibility, ethical behavior and also, eventually, reputation are identified as underlying, intertwined components of the firm’s social responsibility (“Building a solid reputation among its stakeholders is the way for a company to build profitability” p. 116).

Chapter 8 introduces risk considerations for CG. Yet, the chapter focuses mainly on money laundering and corruption risks. Organizational, procedural, and financial risks are ignored. It points out the lack of risk management awareness from numerous companies. Relying on the case of *Hermes Investment Management, Ltd.* it proposes to tackle several principles (respectively financial, communication, strategic, social, ethical and environmental principles) that should be followed in order to help companies gain effective CG.

Lastly, Chapter 9 proposes to investigate the future of CG. It compares and discusses two extreme scenarios — among 20 published by *Shell* in 2002 — that could occur in 2020. The issues on CG attributes (i.e., more specifically board characteristics) are examined in light of the future supposed changes in the institutional, legal, and economic environment. In

order to address the issues the different scenarios may raise, several generic and specific actions (for CG to be effective) are then proposed. For example, generic actions may take the form of a *Society of Non-executive Directors*, or the break-up of big audit firms. Eventually, the author identifies other aspects which should be accounted for, such as the necessity to integrate strategy, reputation and risk management into CG, and the need to focus now on the relationship between shareholders and the board of directors.

Overall, this book provides a rich overview of different CG issues taken from relevant real cases. The governance issues and the attributes addressing them that have emerged in the last decade from practitioners and companies are regularly put into parallel with propositions from diver Reports (i.e., Cadbury, Turnbull, OECD or EU Guidelines, etc.). Yet, it is difficult to understand what we should conclude from the examples in terms of good CG. The analysis would have required a synthesis or at least a comparison among the numerous cases. Hence, the attributes of good CG may appear *ad hoc*, and one may perceive the purpose of the cases as "just" providing a list of attributes or identifying some benchmarks.

The approach is practitioner-oriented, although some concepts are presented also. Furthermore, the book contains very few references from corporate governance academic literature. Its target audience should be, then, more oriented toward practitioners – and may benefit undergraduate students who may gain interesting input from the real-life cases – than researchers.

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International accounting, Timothy Douplik, Hector Perera, McGraw-Hill Education, (2007), (Asia) (International edition 2007), xvi+ 640 pages, £39.99, ISBN: 007-125420-X

The title of this book understates the breadth of its coverage. Overall it lives up to the authors' objective of focusing "on the accounting issues related to international business activities and foreign operations" (p. v). This is not to say that international accounting in the narrow sense of international financial reporting standards is not covered, as almost 40% of the book is devoted to these. However it is mainly the remainder of the book that captures the imagination, surveying accounting-related topics affecting the multinational corporation (MNC) such as taxation, transfer pricing, strategic-management control issues and international auditing. The sheer range of topics covered does mean, however, that this is a book for students already possessing a good accounting knowledge, as will be seen below.

The book does not shy away from the "diversity versus harmonization" tension that faces all treatments of international accounting today. An early chapter covers the nature and sources of international accounting diversity. A clutch of chapters then surveys international

accounting standards, but still retains a diversity theme by also providing outline comparisons with U.S. standards. In addition, there is a chapter containing brief (about 12 pages per country) overviews of accounting practice in five countries selected as being representative of the major clusters of accounting systems—China, Germany, Japan, Mexico and the United Kingdom (where, it should be pointed out, plc stands for public, not private, limited company, see p. 210).

Those standards deemed of special interest to MNCs are dealt with in a fair amount of detail. These include accounting for foreign exchange transactions and hedging (Chapter 6); foreign currency statement translation (Chapter 7); and inflation accounting, consolidations and segmental reporting (all covered in Chapter 8). However, apart from the detailed treatment of the Chapters 6 and 7 topics, in seeking virtually comprehensive coverage of each accounting standard the authors have necessarily had to sacrifice much detail, and it is not always clear what type of readership is being targeted by the resulting summaries of the standards. Thus, reference will be found to almost all international accounting standards other than those mentioned above, but often brief in the extreme. IAS 7 *Cash Flow Statements*, as a typical example, is given 11 lines (p. 140), which enables neither the beginner to learn the principles nor the advanced student to study the finer details. There is insufficient space for any discussion of the motivation for or events surrounding controversial standards, such as those dealing with leasing or intangibles. As a further example, there is a nine-page section on consolidations (p. 354–363). This contains a clear exposition of the concept of control and summarizes alternative consolidation methods, although there is insufficient technical detail for a reader to learn how to actually prepare a set of consolidated financial statements. Pooling of interests is described and its banning in the U.S. and internationally is referred to, but without an explanation of the controversy surrounding it. Similarly no room is devoted as to why the concept of control is so crucial, although the problems of applying it in the Japanese keiretsu system are discussed.

Once the book moves on from international accounting standards, its horizons begin to broaden and interesting issues of international diversity confront the reader. The chapter on international financial statement analysis (Chapter 9) contains an excellent discussion of the difficulties the analyst still faces despite accounting method standardization, including differences in terminology, format and extent of disclosure. The chapter then provides an extensive worked example restating ICI's accounts from the United Kingdom format and GAAP to those of the United States. This provides a valuable framework for both discussion and technical work in an advanced financial analysis course. Once again it should be pointed out that the chapter assumes that the reader is familiar with the basics of financial ratio analysis.

The substantial chapter on international taxation (Chapter 10) is especially welcome as taxation is an area neglected in most accounting texts. It addresses issues such as how tax drives key strategic international decisions, double taxation and international tax planning, and how foreign-currency translation affects a company's tax liability. As with the chapter on transfer pricing, the main detailed regulatory examples draw on United States practice.

The chapter on strategic accounting issues facing MNCs (Chapter 12) examines the problems of capital budgeting and performance measurement in an international context. The final chapter, despite its title *Comparative International Auditing and Corporate Governance* (Chapter 13), focuses almost exclusively on audit issues. It provides a good treatment of

international diversity in audit practice and, in particular, in audit report wording with a wealth of real-world examples. However the differences in emphasis in wording are not linked here to the rules versus principles debate, which is covered much earlier in the book in a section entitled 'What Is This Thing Called Anglo-Saxon Accounting?'

The book contains a large number of accounts extracts of companies from a wide range of jurisdictions. It also has some reference to recent research findings, and provides many case studies for class discussion. Given the broad coverage aimed for, it could have devoted more space to issues related to raising finance on the international stage and to international differences and developments in corporate governance in general. However, for advanced students wishing to extend their horizons beyond the usual treatment of international accounting standards, this book takes us out of the accounts department and presents us with a stimulating discussion of the accounting-related issues faced by the top management of MNCs as well as those who use their published accounts.

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International Accounting and Multinational Enterprises, Lee Radebaugh, Sidney J. Gray, Ervin L. Black, 6th edition, John Wiley & Sons, Hoboken, NJ, USA (2006), xiv + 506 pages, US \$123.95, £86.50, €123.50, ISBN-13: 978-0-471-65269-4, ISBN-10: 0-471-65269-5

First appearing in the 1980s, 'International Accounting and Multinational Enterprises' quickly became a classic among international accounting textbooks. Since then, there have been many changes in the world of accounting: the increasing number of cross-listed firms and the growing power of international investors has made the international accounting harmonization not just a wish but a reality. Multinationals have expanded their influences in the world economy and operate in a more innovative but challenging environment (increasing M&A activities, popularization of financial instruments, and tighter regulation and monitoring). Last but not least, there are now many more textbooks in English in the area of international accounting than when the first edition of their book was published.

Radebaugh, Gray and Black's 6th edition is the newest textbook trying to cope with new challenges. From its inception, the book has been taking a unique position compared to other international accounting textbooks: '*This book presents international accounting within the context of managing multinational enterprises (MNEs)*' (Preface, p. x). In fact, the authors hope that this book will serve as a sort of one-stop solution toolbox for B-school students and managers by covering main accounting issues in multinational enterprises, including financial accounting, managerial accounting and control, auditing, corporate governance and taxation.

1. Organization of the book

The material is covered in 16 chapters. In the first introductory chapter, the authors describe the field of international accounting and link it to international business. After summarizing the international accounting history, this chapter covers firms' internationalization, factors influencing accounting development, and aspects of accounting in multinationals. This chapter is essential as a 'bridge' into the international business field, for accounting students or into the accounting area for international business students.

Chapter 2 covers the literature on international accounting classification and cultural dimensions. Chapters 3 and 4 present country-specific studies on major developed and developing nations. Chapter 5 relates to the major differences in international accounting and their effects on financial statement analysis. Chapter 6 focuses on disclosure practices in multinationals. Chapter 7 concentrates on accounting harmonization. Beginning with Chapter 8, the book starts to treat, one by one, main accounting issues in multinationals: business combinations, goodwill and intangibles (Chapter 8), segment reporting (Chapter 9), foreign currency (Chapter 10), inflation (Chapter 11), corporate governance (Chapter 12), derivatives (Chapter 13), budgeting and performance evaluation (Chapter 14), auditing (Chapter 15) and taxation (Chapter 16).

Each chapter starts with the learning objectives and ends with a summary, discussion questions, exercises and selected references. Supplementary cases (two per chapter) are downloadable from the book website. There is also a complete set of instructor's resources on the website, including PowerPoint presentations, instructor's manual, test bank, cases, Excel solutions, practice set solutions, case solutions, discussion question solutions, exercise solutions and a practice set. The book is well written in a clear, straightforward manner. The examples given in the book are relevant, timely and with an international perspective.

2. Some comments and suggestions

In the following section, I present some comments and suggestions from my reading and use of the book in my lectures.

Regarding Chapter 1, I find that the current edition of the book, the information is divided into too many sections and the transition from one section to another is not very smooth. In the next revision, perhaps the authors could start with accounting issues (history, factors), then cover the development of multinationals, ending with accounting aspects in multinationals.

Chapter 2 contains essential information for students learning international accounting. It allows students to move from detailed and country-specific accounting issues to a general picture of accounting systems in the world. I think the chapter would benefit from the inclusion of international finance literature on law system, legal enforcement and ownership (La Porta, Lopez-De-Silanes, Shleifer & Vishny, 1997, 1998, 1999, 2000, 2002; La Porta, Lopez-De-Silanes & Shleifer, 1999, 2006), and connecting this information with existing accounting classification literature.

The titles and subtitles of Chapters 3 and 4, are a bit confusing. First, since the accounting system in each country is presented separately, the information is not really "comparative". Second, from the titles and subtitles, readers cannot know that Chapter 3

deals with accounting systems in major developed countries and Chapter 4 with accounting systems in major developing countries. Third, the subtitles (sections) correspond roughly to the clusters obtained from international accounting classification literature except for "Asian Accounting". Putting Japan and China into the same "Asian Accounting" category implies their accountings are quite similar, which is not the case for historical, political and economic reasons (personally, I prefer to see China with the Eastern European Group). If we admit that "Asian Accounting" is a geographic term, then authors should also include India and Malaysia in this category.

One remark on Chapter 5 is that nowadays, thanks to the success of IFRS, there are fewer and fewer accounting *de jure* (at GAAP level) (Tay & Parker, 1990) differences in the consolidated accounts of multinationals, which is the scope of the analysis in this book (if we admit that there are few differences between United States GAAP and IFRS and put Japan apart). In the next edition, it might be more interesting for the authors to concentrate on international financial analysis difficulties caused by the legal enforcement of the country (GAAP compliance) and differences in business environment (Choi et al., 1983; Brown & Stickney, 1992).

Finally, I wish to remark on the global structure of the book. The 16 chapters of the current edition are not grouped into clusters (or parts). Some of my students found that the current structure made it a bit difficult to locate specific information. Maybe after the introductory chapter, the authors could divide the book into two parts: international accounting studies (including Chapters 2, 3, 4, 5 and 7) and accounting issues in multinationals (including Chapters 6, 8–16). Furthermore, since the multinational enterprise is the key issue in this book, the authors should clarify the definition of Multinational Enterprises. This organization part two on accounting issues in multinationals would make the book more reader-friendly. Since different types of internationalization induce different accounting issues, Chapters 6 and 8–16 could have been organized thus: commercial and investment internationalization (exporting, joint venture and M&A); related accounting issues are Chapters 8, 9, 10, 11, 12, 14 and 16; and financial internationalization (cross-listing, foreign shareholding within the multinational) related accounting issues are in Chapters 6, 12 and 15.

3. Conclusions

In summary, I think this book is well worth reading and using in the classroom. The comments and critiques mentioned above are meant as suggestions for future improvements. As I mentioned in the beginning of this review, the positioning of this book as a text on accounting for multinationals is very useful for two populations of students: those majoring in accounting, who have an interest in international business or those majoring in international business generalist MBAs, who wish to extend their knowledge into the field of international accounting.

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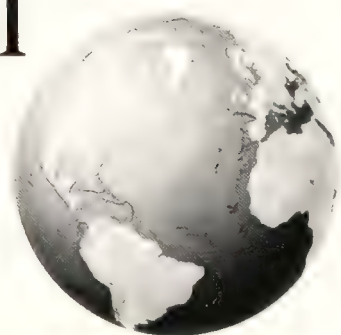
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Cross-sectional variation in the economic consequences of international accounting harmonization: The case of mandatory IFRS adoption in the UK^{1,2}

Hans B. Christensen, Edward Lee^{*}, Martin Walker

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Abstract

This study examines the economic consequences for UK firms of the European Union's decision to impose mandatory IFRS. We hypothesize that the impact varies across firms and is conditional on the perceived benefit. We estimate a counter-factual proxy for a UK firm's willingness to adopt IFRS from the prior GAAP choices of German firms. We show that this proxy predicts cross-sectional variations in both the short-run market reactions and the long-run changes in cost of equity that are associated with the decision. This implies that mandatory IFRS adoption does not benefit all firms in a uniform way but results in relative winners and losers.

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Keywords: International Financial Reporting Standards; Mandatory adoption; Economic consequences

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1. Introduction

The mandatory adoption of IFRS¹ in the European Union (EU) is one of the largest regulatory experiments in financial reporting ever undertaken, and may eventually prove to be a vital step towards global GAAP harmonization.² The EU and European Economic Area (EEA) include 30 countries with integrated financial markets and more than 7000 listed firms. Almost all EU EEA listed firms are legally required to adopt IFRS in their consolidated statements no later than 2005.³

In this paper, we examine the economic consequences of mandatory IFRS adoption for United Kingdom (UK) listed firms. We study both the short-term price response to news about IFRS adoption, and the changes in the implied cost of equity for a large sample of firms between a date before the mandatory adoption was expected and a date by which mandatory adoption was effectively certain.

The short-run share-price response and long-run implied cost of equity methods complement each other when testing the effect of mandatory IFRS adoption. The potential advantage of focusing on short-run abnormal returns is that we are able to isolate specific days when news affects all firms in the sample. The disadvantage is that it is reliant on precise identification of the event days. In particular it assumes that there has been no leakage of the policy deliberations to the market. Unfortunately the dates on which the probability of mandatory adoption of IFRS changed are debatable. In contrast, an advantage of using the implied cost of equity method is that it is not sensitive to the identification of specific dates – we simply exclude the period of uncertainty and test the difference between the implied cost of equity before and after the announcement period. However, the estimation of the implied cost of equity is also potentially problematic, because it is often difficult to control for all factors affecting the implied cost of equity over a long period of time. Thus we view the two methodologies as being complementary and we believe that their joint use should increase the robustness of our conclusions.

We hypothesize that UK firms vary in their willingness to adopt IFRS, because the costs and benefits of IFRS adoption are likely to vary across firms. In terms of the literature on accounting choice, the decision to mandate IFRS for UK quoted firms was unusual in the sense that it cannot be simply portrayed as the imposition of a restriction on the accounting choices of UK firms. Prior to 2005 UK firms were not permitted to adopt IFRS for UK financial-reporting purposes. After 2005, UK firms are not allowed to use pre-2005 UK GAAP in their consolidated statements for financial reporting purposes. Thus the EU decision changed the choice set for UK firms by mandating a new set of rules for financial

International Financial Reporting Standards (IFRS) is the name of accounting standards produced by the International Accounting Standards Board (IASB).

The EU's motive for adopting the regulation is the creation of a more transparent and efficient capital market that will facilitate a lower cost of capital for EU firms (EC16/06/2002)

EC 16/06/2002 requires all listed firms in a regulated market to comply with IFRS in their consolidated statements no later than 2005 unless they are listed in non-member state and have been using internationally accepted standards prior to September 2002. Member countries can allow adoption to be postponed until 2007 for firms that comply with US-GAAP. The UK has decided not to use this option and all listed firms in a regulated market are, therefore, required to comply with IFRS from 2005.

reporting that some UK firms might have adopted voluntarily, if they had been given the choice. If UK firms had been given a choice between UK GAAP and IFRS it is logically possible that some would have chosen not to adopt IFRS, and some would have chosen to abandon UK GAAP in favor of IFRS. Thus it is possible that some UK firms would have been constrained by the EU's decision, while others would have been liberated.

For the purposes of this paper we need a counter-factual proxy for what choices UK firms would have made, if they had been given an option to choose between UK GAAP and IFRS. One possibility, which we explore in this paper, is to exploit the information in the choices made by firms in an economy similar to the UK, but where firms had the choice to adopt IFRS before 2005. In particular Germany is a major EU economy that allowed early adoption of IFRS and that also experienced extensive early adoption. This combination of Germany and the UK as two major EU economies, but with very different IFRS adoption processes, produces a unique setting for testing the factors affecting the economic consequences of mandatory IFRS adoption.

We hypothesize that the characteristics of voluntary early adopters of IFRS or US-GAAP⁴ in an EU jurisdiction that allowed voluntary adoption of international accounting standards (IFRS or US-GAAP) might serve as a viable proxy for how UK firms might have behaved given the same choice. In particular we focus on the choices made by German firms.⁵ In Germany, listed firms have had the option to choose between an international accounting regime (IFRS or US-GAAP) and domestic standards for their consolidated statements since 1998.⁶ Economic theory predicts that firms committing to an international accounting regime are those that perceive the greatest net-benefit. We measure the degree of similarity to German voluntary adopters by estimating a logistic choice-model using German data and calculating the probability of voluntary adoption in the UK based on this model. We use the estimated probability of voluntary adoption from our model based on German firms as a counter-factual proxy for the probability of voluntary adoption by UK firms.

The advantage of this approach is that it focuses on actual observed choices, there is no potential for response bias, and it is based on a large population of firms. The disadvantage of this approach is that the German GAAP and financial disclosure regime is not the same as UK GAAP. The choice between UK GAAP and IFRS for UK firms is not the same as the choice between German GAAP and IFRS for German firms. For example, German IFRS adopters will typically experience a greater leap in disclosure quality. Due to these differences one might expect two sets of determinants for firms' willingness to switch to IFRS, i.e., one set that is common across both countries and another set that is country-

⁴ For brevity we describe German firms that comply with either IFRS or US-GAAP in 2002 as voluntary adopters in this paper.

⁵ An alternative approach might be to ask firms directly what they might have done if they had been given a choice. However this approach is also problematic for the following reasons: 1) firms may not know what they would have done given the choice, 2) many firms may be unwilling to respond to the survey (typical response rates are 20–30%), 3) some firms may not tell the truth.

⁶ In April 1998 Kap.AEG was adopted in Germany allowing listed firms the option only to comply with either IFRS or US-GAAP in their consolidated statements.

specific. For instance, factors that correlate with corporate governance may be less transferable from Germany to the UK. Convincing outside investors that the firm is committed to improved corporate governance may be an underlying motive that is more important to firms in Germany due to the ownership and legal system they operate in. The implications of this fact for our research design is that we run the risk of identifying some determinants from the German adopters that are not necessarily relevant to the UK firms, which would add noise and reduce the power of the tests based on the UK sample. Thus our analysis reports two sets of results for the UK. One set assumes that the choice model for the UK is the same as for Germany. The other set attempts to isolate the Germany-specific choice drivers from the common drivers.

We find that the common-driver set produces consistent results both for implied cost of capital changes and for the short-run market responses. In both cases we find a significant positive cross-sectional association between the economic response to mandatory IFRS adoption and our counter-factual proxy for the probability of voluntary adoption by UK firms.

The study makes two main contributions. First, understanding that the costs and benefits of IFRS adoption varies systematically across firms is important not only to countries that have already decided to make IFRS mandatory, but also to countries that are currently considering taking this step. Second, the study also makes a novel methodological contribution, by showing that under certain circumstances the information contained in voluntary GAAP choices in one economy can predict the economic responses to a mandatory GAAP change in a similar economy.

The remainder of the paper is organized as follows. Section 2 reviews the literature in the area and Section 3 develops the testable hypotheses of the paper. Section 4 describes the methodology and sample including the key dates that changed the likelihood of mandatory IFRS in the EU and the calculation of the counter-factual proxy for voluntary adoption in the UK. Section 5 presents the results and discusses the implications. Section 6 summarizes the paper.

2. Literature review

2.1. Voluntary adoption

Until recently, empirical studies on the connection between GAAP changes and the cost of capital have focused on voluntary adoption of either IFRS or US-GAAP over domestic standards. The assumption is that the accounting regime affects the quality of information and that the quality of information in turn affects the cost of capital.

One stream of research examines proxies for the cost of capital either within an event study around the adoption of IFRS or US-GAAP, or cross-sectionally between firms that have adopted IFRS or US-GAAP and firms that use local-GAAP. Leuz and Verrecchia (2000) and Leuz (2003) take this approach by examining bid ask-spreads, trading volume

and share price volatility as proxies for the information asymmetry component of the cost of capital. They find reduced information asymmetry when firms change from German GAAP (HGB) to either IFRS or US-GAAP, but no significant difference between IFRS and US-GAAP. Contrary to this conclusion, Daske (2006) finds no evidence of a reduced cost of capital when using both the residual-income valuation model and the Ohlson and Juettner-Nauroth (2005) abnormal earnings growth model to estimate the implied cost of equity. These three studies limit their sample to German firms, thus keeping the institutional settings constant. Cuipers and Buijink (2005) use a European sample to test the affect of changing from local-GAAP to either IFRS or US-GAAP. They examine information asymmetry proxied by analyst following, forecast dispersion and stock return volatility and the implied cost of capital estimated using the method suggested by Easton, Taylor, Shroff, and Sougiannis (2002). They document a positive effect of adopting IFRS or US-GAAP on analyst following, but fail to find support for a lower implied cost of equity. Dargemidou, McLeay, and Raonic (2006) also use a European sample to test how the change from local GAAP to international accounting standards (IFRS or US-GAAP) affected the estimated cost of capital using the Ohlson and Juettner-Nauroth (2005) abnormal earnings growth model. Contrary to Daske (2006) and Cuipers and Buijink (2005) they find that the cost of capital increased by more than 4% after voluntary adoption but that the effect is smaller for large firms. Daske, Hail, Leuz, and Verdi (2007) extend these studies by focussing on whether the impact varies with the degree of compliance. Survey evidence documents that compliance varies considerably among voluntary adopters (Cairns, 1999, 2000). Daske et al. (2007) show that the cost of capital is only reduced when adoption is serious (i.e., leads to improved accounting quality). The heterogeneity that they document in the voluntary setting arises from differences in compliance level. The heterogeneity that we explore in the mandatory setting arises because the willingness to adopt varies across firms. To summarize, prior research that uses proxies for either the cost of capital or components of the cost of capital have produced mixed results.

Another stream of research looks at the market reaction to the announcement of future compliance with IFRS or US-GAAP. The idea is that the market reaction around the announcement contains the change in the required risk premium, and thus impounds the change in the cost of capital. Pellens and Tomaszewski (1999) find insignificant market reactions to the announcement of future compliance with either IFRS or US-GAAP in Germany. The statistical power of their test is, however, low due to a sample size of only 16 firms. Karamanou and Nishiotis (2005) use an international sample of 54 firms adopting IFRS and show that firms experience abnormal positive returns around the announcement of future compliance with IFRS. They also find evidence that the positive market reaction is not identical among firms with different characteristics. Thus, firms with low valuations and high growth opportunities experience a stronger market reaction. Karamanou and Nishiotis suggest that firms use the adoption of IFRS to signal to the market that they are undervalued. This signalling motive does not apply to the mandatory-adoption setting as in the case of the UK. Indeed, the study of mandatory adoption differs from voluntary adoption in two ways. First, mandatory adoption eliminates the self-selection issues inherent in voluntary adoption. Second, the choice to voluntarily adopt is a signal that includes information in itself, which could be difficult to disentangle from the underlying issue a study seeks to examine.

2.2. Mandatory adoption

Three prior studies examine mandatory rather than voluntary adoption of IFRS. Comprix, Muller and Stanford-Harris (2003) examine abnormal returns around the dates of public announcements that increase the likelihood of mandatory IFRS in the EU. They apply the Sefcik and Thompson (1986) approach to evaluate the relationship between announcement returns and a number of firm and country characteristics. They find that firms that are a) audited by a big 5 auditor, b) located in countries that will experience the greatest increase in quality of financial information as a consequence of IFRS, and c) are subject to the highest level of legal enforcement experience significant positive returns. Apart from the nature of the auditor these characteristics are all country specific. Although the methodology of Comprix et al. (2003) is similar to the market-reaction test we conduct in our study, the underlying research question is different. While they predominantly examine differences among country characteristics we investigate the role of firm characteristics within one country, which keeps the institutional framework constant.

Armstrong, Barth, Jagolinzer, and Riedl (2006) also investigate market reactions to events that they argue would affect the likelihood of mandatory IFRS in the EU. Unlike Comprix et al. (2003), which studies the events from 2000 to 2002, they analyze later events between 2003 and 2004 that are related to the endorsement of the IFRS standards in general and IAS 32/39 in particular. In general, they find positive (negative) market reactions to events they classify as increasing (decreasing) the likelihood of mandatory IFRS and interpret this as evidence that investors perceive benefits of harmonized accounting standards under IFRS. The focus of Armstrong et al. (2006) is on whether mandatory IFRS is good or bad as perceived by investors. In our study, the focus is instead on the differences in the economic consequences of mandatory IFRS between firms that are likely to incur relative benefits and costs due to the decision. Differences in economic consequences are of particular interest when evaluating a mandatory policy change. Since all firms by definition are treated equally by such a policy, those that are disadvantaged by the policy are still forced to comply.

Instead of examining the short-term market reactions, Pae, Thornton, and Welker (2006) investigate the consequences of mandatory IFRS by looking at Tobin's Q. They show that firms with high agency cost measured by concentration of control and excess of the largest shareholder's voting rights over cash flow rights experience relative increases in valuation as a consequence of mandatory IFRS. The underlying idea in the study is that the shares of some firms trade at a discount due to weaker protection for minority shareholders and that mandatory IFRS force these firms to improve their disclosure, which in turn reduces the discount. Pae et al. (2006) use a European sample where early adoption is allowed in several countries and national disclosure quality generally is lower than IFRS. In this setting it makes sense to test whether the restrictions imposed by mandatory adoption of IFRS have benefited some investors. Contrary to this we restrict our test to a UK setting where firms have not had the option to comply with IFRS voluntarily. Furthermore, the disclosure quality in our UK setting is generally high and it is unsure whether IFRS is an improvement for all firms. Our

sample is more relevant for an investigation into whether or not relative benefits differ across firms than whether or not it enhances protection of minority investors.

The key contribution of our study to the literature is the focus on firm-specific cross-sectional differences in the economic consequences of mandatory IFRS. We define the firm-specific differences through a counter-factual proxy for willingness to adopt. The idea is that heterogeneity in the economic consequences of mandatory IFRS arises because some firms are forced to comply against their will, while others have net benefits and would have complied voluntarily had they been given the opportunity. We are not aware of any prior studies that connect the voluntary accounting GAAP commitment of firms in one country to the economic consequences of a mandatory policy in another country.

3. Hypotheses development

The starting point of our analysis is the assumption that the costs and benefits of IFRS adoption, relative to firm value, will vary across firms. The mandatory adoption of IFRS imposes two kinds of changes on the financial-reporting practices of firms. First, firms are required to adopt a new set of accounting-measurement rules that in some cases will have a material effect on a firm's reported earnings and balance-sheet values, and in other cases will not. Second, IFRS introduces a new set of required disclosures that in some cases will be greater than the original disclosure requirements and in other cases less.

Empirical research suggests that the cost of capital is related to both disclosure and measurement policies. Examples of such studies are Botosan (1997), that examines the association between disclosure levels and the implied cost of equity, and Francis, LaFond, Olsson, and Schipper (2004), that examines the relationship between earnings attributes and the implied cost of equity. Both studies find that a lower quality of information is associated with a higher cost of capital. The main hypothesis of this paper is (stated in alternative form):

H 1. The cross-sectional variations in the economic consequences of mandatory IFRS adoption by UK firms are related to the probability that the firm would have adopted IFRS voluntarily if it had been given the choice.

In order to convert H 1 into an empirically testable proposition we need to identify specific, measurable, economic consequences, and we need to specify how to model the probability of (counter-factual) voluntary adoption by UK firms. For the purposes of this paper we focus on two, potentially related, types of economic consequences. First we consider the market response to news about the decision by the EU to mandate IFRS. Second we consider the relative change in implied cost of equity between the time when the EU started to consider IFRS adoption and the time when the decision to adopt IFRS was effectively final and binding on all member states.

The main hypothesis is divided into two testable hypotheses (stated in alternative form):

H 1A. The stock price reaction of UK firms to announcements that increased (decreased) the likelihood of mandatory IFRS adoption is positively (negatively) related to their degree of similarity to the characteristics of German voluntary IFRS adopters.

H 1B. The change in the implied cost of equity of UK firms before and after the mandatory IFRS adoption decision is negatively related to their degree of similarity to characteristics of German voluntary IFRS adopters.

Both hypotheses exploit the fact that an informationally efficient market should rapidly incorporate the expected costs and benefits of IFRS adoption into share prices. That is to say, that if the market expects UK firms with characteristics similar to German early adopters to derive a relative benefit from IFRS adoption over other firms then such firms should experience a reduction in their relative cost of capital after future mandatory IFRS adoption became known, and a relatively positive (negative) response to news indicating that mandatory IFRS adoption was more (less) likely.

Hypothesis H1A tests how the market initially received the news of mandatory IFRS adoption. Hypothesis H1B tests how the market perceives mandatory IFRS adoption in the longer run. Consistent results for H1A and H1B should increase the robustness of the conclusion with regard to the main hypothesis.

In thinking about these hypotheses it is important to recognize that our focus is on the possibility that some firms may benefit more than others from the implementation of IFRS. In particular we do not deny the possibility that the value of IFRS adoption could be relatively greater in Germany than in the UK. Indeed, while there does seem to be a common perception that IFRS could be beneficial for German firms (Leuz and Verrecchia, 2000), the general perception of IFRS seems less favourable for UK firms. Studies such as Ginger and Rees (2001) show that UK-GAAP and IFRS are generally assumed to be very close. Some practitioners hold the belief that UK GAAP is of higher quality than IFRS.⁹ However, despite such perceptions recent empirical evidence has found that the investment decisions of fund managers in the UK have been affected by the transition to IFRS.¹⁰

Furthermore, we are not concerned in this paper with testing the overall effect of mandatory IFRS adoption on the cost of capital of UK firms. It could be that the median level of accounting information quality decreases in the UK due to IFRS being of a lower quality than UK accounting standards, but at the same time the effect of IFRS adoption could be smaller for UK firms similar in characteristics to German volunteer adopters. In this case our main alternative hypothesis would be accepted in the UK even though the overall affect of introducing IFRS was to decrease the quality of financial statements and increase the cost of capital.

Another issue we face in relation to the changes to measurement and disclosure policies due to IFRS is the differences between Germany and the UK. Economic intuition suggest that a firms' accounting policy choice is driven by it's perception of net benefits. If the perceived net-benefits are at least partly determined by a function of measurement and disclosure issues then it is unlikely to be identical for Germany and the UK due to their institutional differences. Ball (2006) and Nobes (2006) both analyse how differences in

⁹ See Accountancy, January 1999, p. 6, and Accountancy, May 1999, p. 77, for examples.

¹⁰ In a PwC MORI (2005) survey of fund managers, 70% said that they found the first IFRS information fairly useful or very useful, 29% reported that the disclosure had influenced them to disinvest from a company, and 21% said that they had been influenced to not invest in a company and 13% had been influenced to invest.

financing, ownership, legal, and taxation systems across countries influence the development of their domestic accounting regulations and suggest that this is likely to have effects on the implementation of IFRS.

Thus, to the extent that these institutional differences affect the decision of IFRS adoption, there will be country-specific factors in Germany that are not transferable to the UK context and therefore induce noise into our counter-factual proxy for a UK firm's willingness to adopt IFRS. That is to say, our research design potentially underestimates the differences in economic consequences and therefore we run the risk of failing to reject that no differences exist when differences actually exist. Thus this issue, in effect, loads the dice in favor of our null hypothesis. The fact that we are able to reject the null, in spite of this issue, suggests that even stronger results in support of our alternative hypotheses could be found if a more powerful counter-factual proxy could be designed than the one we use here.

4. Methodology and sample

4.1. Development of the counter-factual proxy

In this section we explain the development of the counter-factual proxy for UK firms' willingness to adopt IFRS based on their degree of characteristics similar to German voluntary IFRS adopters. We use the observed voluntary GAAP choices of German firms to predict which UK firms would be more likely to adopt IFRS given the same choice. The following logistic regression models are used to explain the choice of German firms:

$$\text{Adopter}_i = \alpha_0 + \alpha_1 \text{FS}_i + \alpha_2 \text{DTM}_i + \alpha_3 \text{LMV}_i + \varepsilon_i \quad (1)$$

$$\text{Adopter}_i = \beta_0 + \beta_1 \text{FS}_i + \beta_2 \text{DTM}_i + \beta_3 \text{LMV}_i + \sum_{k=4}^{10} \beta_k \text{INDDUM}_{k,i} + \varepsilon_i \quad (2)$$

$$\text{Adopter}_i = \gamma_0 + \sum_{k=1}^7 \gamma_k \text{INDDUM}_{k,i} + \varepsilon_i \quad (3)$$

The dependent variable (Adopter) is assigned the value of one if firm i complies with an international accounting regime in 2002 and the value of zero otherwise.¹⁰ FS is the foreign sales divided by total sales, DTM is the long-term debt divided by the sum of its long-term debt and market value, LMV is the natural logarithm of the market value, and INDDUM are seven industry dummies set equal to one for the industry for which the firm belongs and zero otherwise. Model 1 (Eq. (1)) only includes the three firm-characteristic variables that measures foreign sales, leverage, and size. To capture the long-run norm, we

¹⁰ We do not distinguish between IFRS and US-GAAP. The reason is that we are interested in firms that have net-benefit of committing to an international accounting regime regardless which one. We do, however, re-run the models excluding firms complying with US-GAAP. The results are consistent in all material aspects, which is also consistent with the result of Leuz (2003).

use the five-year mean value of these variables from 1998 to 2002. Model 2 (Eq. (2)) adds seven industry dummies to the existing independent variables in Model 1 in order to incorporate any industry effect. Model 3 (Eq. (3)) includes only these industry dummies. We group firms into industries using the *Worldscope* industry classification. The three variants enable us to observe whether firm characteristics or the industry is more relevant in capturing the economic consequences of mandatory IFRS. In the process of developing our choice model from the German sample, we experimented with additional variables such as operating margin as a proxy for performance, sales growth as a proxy for growth, and operating cash flow as a proxy for finance need. Unfortunately, none of these were statistically significant. This is not surprising since existing studies (e.g., Ashbaugh, 2001; Cuijpers and Buijink, 2005; Harris and Muller, 1999; Leuz, 2003; Leuz and Verrecchia, 2000; Tarca, 2004) find mixed results and the way in which these variables influence accounting-policy choice remains under debate. Therefore, to avoid weakening the power of our counter-factual proxy in distinguishing UK firms' willingness to adopt the IFRS, we excluded these variables from our final models in Eqs. (1) and (2).

In determining the explanatory variables in Eqs. (1), (2), and (3), we refer to the firm characteristics identified in the existing literature on voluntary accounting-regime choices such as Harris and Muller (1999), Leuz and Verrecchia (2000), Ashbaugh (2001), Leuz (2003), Tarca (2004) and Cuijpers and Buijink (2005). These studies generally argue that the decision to adopt an international accounting regime is a function of financial performance, leverage, firm size, finance need, and cross-listing. Tarca (2004) adds foreign exposure and industry as explanatory variables. An important issue in applying these to our research design is to find proxies that are the same under international accounting standards and German domestic standards. Significant differences could result in wrong conclusions. For instance, leverage measured as total liabilities divided by book value of equity, is larger under HGB than under IFRS (Hung and Subramanyam, 2004). This relationship is driven by the book value of equity being measured significantly lower under HGB than under IFRS, which is consistent with HGB being more *ex-ante* conservative than IFRS. Hung and Subramanyam (2004) perform a survey of reconciliation items disclosed by firms that adopt IFRS for the first time. Hung and Subramanyam (2004, Table 4) show that differences are significant for total assets and the book value of equity. We therefore avoid these accounting figures.¹¹ Furthermore, theoretical predictions suggest that information asymmetry, analyst following, and liquidity motivate disclosure choices and proxies for these are, therefore, possible explanatory variables. Despite this there is a likelihood that their incorporation in the choice-model estimated on German data will induce causality and/or endogeneity problems because prior studies (e.g., Cuijpers and Buijink, 2005; Leuz and Verrecchia, 2000) suggest that these variables are influenced by voluntary adoption. In line with the existing literature on accounting standard choices, we therefore exclude these variables (e.g., Ashbaugh, 2001; Cuijpers and Buijink, 2005; Harris and Muller, 1999; Leuz, 2003; Leuz and Verrecchia, 2000; Tarca, 2004).

In Eqs. (1) and (2) our measure of leverage is affected by the accounting regime. According to Hung and Subramanyam (2004) total liabilities tend to be lower under HGB than under IFRS. This means that our measure of leverage will be biased towards zero, thus underestimating leverage's effect on the choice of an international accounting regime.

Due to the difficulty in identifying variables that are available under the same definition in both Germany and the UK, as well as limitations in data availability, we exclude direct proxies of corporate-governance variables in our study. However, we do not rule out the possibility that the leverage variable and/or industry dummies we include in Eqs. (1), (2), (3) may indirectly capture cross-sectional variations in corporate governance structure. Existing studies argue that leverage proxies the level of “insider” finance available to the firm, which in turn affects a firm’s disclosure incentives, because insiders do not rely on public disclosures (e.g., Cuijpers and Buijink, 2005; Meek, Roberts, and Gray, 1995; Zarzeski, 1996). Variations across industries have also been documented for governance mechanisms such as ownership structure (Demsetz and Lehn, 1985), executive compensation (Aggarwal and Samwick, 1999), and board structure (Agrawal and Knoeber, 2001). Gillian, Hartzell, and Starks (2003) also find that the strength of monitoring through board and charter provisions is industry specific. Another variable that could possibly serve this purpose is free-float but the trade-off here is a significantly reduced sample size. Since Leuz and Verrecchia (2000) find that free-float is insignificant (p -value 0.96) in Germany, leaving this variable out of the equation is unlikely to bias our results significantly. In terms of finance need, the most commonly applied proxy in the voluntary-adoption literature is a dummy variable taking the value of one if the firm issued equity after adoption, which generally turns out significant in prior studies (e.g., Ashbaugh, 2001; Harris and Muller, 1999). The intuition is that firms planning to issue capital in the future are more likely to adopt voluntarily to decrease the cost of capital. However, in the context of mandatory adoption this line of argument does not hold and it is unclear from which time period we should collect the data in order to make the test comparable to prior studies. An alternative approach would be to define it in terms of capital intensity (long-term assets/total assets), following Leuz and Verrecchia (2000). The problem of applying this proxy in our study is that both long-term assets and total assets are highly affected by the change from German GAAP to an international accounting regime. This makes it difficult to distinguish between the effect of changing the accounting regime and the effect of the finance need the proxy was meant to capture. Our existing models avoid the empirical measurement problems of corporate governance and finance need variables. Assuming that corporate governance, finance need, and other possible variables have accounting-policy-choice implications, their exclusion would reduce the explanatory power of the counter-factual proxy applied in the UK and reduce the chances of finding results in support of our hypothesis. While we do not deny the theoretical relevance of these variables to the context of our study, we leave them for future research as the objective for this paper is to investigate whether there are cross-sectional differences in economic consequences not to identify all possible drivers of these differences.

We compute the counter-factual proxy for a UK firm’s willingness to adopt IFRS as follows:

$$\theta_{i,t} = \hat{\gamma}_0 + \hat{\gamma}_1 FS_i + \hat{\gamma}_2 DTM_i + \hat{\gamma}_3 LMV_i \quad (4)$$

$$\theta_{i,t} = \hat{\beta}_0 + \hat{\beta}_1 FS_i + \hat{\beta}_2 DTM_i + \hat{\beta}_3 LMV_i + \sum_{k=4}^{10} \hat{\beta}_k INDDUM_{k,t} \quad (5)$$

$$\theta_{i,j} = \hat{\gamma}_i + \sum_k \hat{\gamma}_k \text{INDDUM}_{k,j} \quad (6)$$

$$\text{Pr}_l = \frac{1}{1 + e^{-\theta_{l,j}}} \quad (l = 1, 2, \text{ and } 3) \quad (7)$$

where Pr_l are the probabilities of voluntarily IFRS adoption by firm j based on model l (i.e. Models 1, 2, and 3), coefficients $\hat{\alpha}_0$ to $\hat{\alpha}_3$, $\hat{\beta}_0$ to $\hat{\beta}_3$, and $\hat{\gamma}_0$ to $\hat{\gamma}_6$ are estimated from Eqs. (1), (2), and (3) respectively, and $\text{FS}_{i,j}$, $\text{DTM}_{i,j}$, $\text{LMV}_{i,j}$, and $\text{INDDUM}_{k,j}$ are proxies of foreign exposure, leverage, size, and industry dummies for firm j . The definition of these independent variables follows their German sample counterparts described earlier and are measured as the five-year mean over the same period of 1998–2002. Model 4 assumes that FS, DTM, and LMV are the common drivers between the UK and Germany. Model 5 assumes that the industry dummies that are relevant for German voluntary adoption are also relevant drivers for the UK. This assumption will be incorrect if the industry dummies proxy the governance motive for IFRS adoption by German firms.

4.2. Test of H1A

Hypothesis H1A assumes there is a positive relationship between a UK firm's degree of similarity to the characteristics of German voluntary IFRS adopters and their stock-price reaction to announcements relating to mandatory IFRS adoption. To test H1A we apply the Sefcik and Thompson (1986) portfolio-weighting approach commonly used to test the effect of firm characteristics on stock market reaction to time clustered events (e.g., Comprix et al., 2003; Li, Pincus, and Rego, 2004). This approach involves the following steps. First, construct a matrix F defined as follows:

$$F = [\text{Int} \quad \text{Pr}] \quad (8)$$

where Int is an $N \times 1$ vector of one and Pr is an $N \times 1$ vector of the degree of UK firms' similarity to German volunteer adopters (based separately on Models 1, 2, and 3) and N is the number of sampled UK firms. Second, create portfolio weights W as follows:

$$W = \begin{bmatrix} W'_{\text{Int}} \\ W'_{\text{Pr}} \end{bmatrix} = (F'F)^{-1}F' \quad (9)$$

where W'_{Int} is the row of portfolio weights based on Int , W'_{Pr} is the row of portfolio weights based on Pr , and F is the $N \times 2$ matrix defined in Eq. (8). Third, compute the returns ($R_{\text{Pr},t}$) of the portfolio weighted on the information pertaining to Pr as follows:

$$R_{\text{Pr},t} = W'_{\text{Pr}} R_{i,t} \quad (10)$$

where $R_{i,t}$ is the $N \times 1$ vector of individual firm stock returns on day t , and t covers 521 trading days from 01/01/1999 to 31/12/2000. Finally, we run the following time-series regression:

$$R_{\text{Pr},t} = \gamma + \beta R_{m,t} + \sum_k \alpha_k D_{k,t} + \epsilon_t \quad (11)$$

where α is the intercept, β is the risk coefficient, R_{mt} is the return on Financial Times All Shares Index on day t , $\hat{\alpha}_k$ is the risk-adjusted abnormal returns pertaining to event k , $D_{k,t}$ is a dummy variable for the k th event during the three-day period (days -1 , 0 , and $+1$ relative to the announcement date) and is set to one (-1) if the event is assumed to be favorable (unfavorable) to mandatory IFRS adoption and zero otherwise. Eqs. (9) and (10) can also be implemented on the *Int* portfolio, but for brevity we do not report the results. The risk-adjusted abnormal return $\hat{\alpha}_k$ reflects the effect of Pr on the stock price reaction to the events examined. Sefcik and Thompson (1986) argue that these estimates are equivalent to those in a cross-sectional regression of abnormal returns on firm characteristics but fully control for the cross-correlation and heteroskedasticity in firm disturbances, which is essential in time-clustered event studies.¹

Eq. (11) estimates the relationship between UK firms' degree of similarity to German voluntary IFRS adopters and their stock market reaction to the relevant announcements. In H1A, we expect that UK firms with higher Pr values should enjoy a relatively more positive market reaction to announcements that are favourable to mandatory IFRS adoption. This is because they share greater similarity in characteristics to the German voluntary adopters whose accounting regime commitment is due to their perceived net benefits.

4.3 Test of H1B

Hypothesis H1B assumes that long-run changes in the cost of capital of UK firms after the mandatory IFRS adoption decision is negatively related to their degree of similarity to the characteristics of German voluntary adopters. To test this hypothesis, we calculate the implied cost of equity capital based on the Ohlson and Juettner-Nauroth (2005) abnormal earnings valuation model and the Easton (2004) PEG model. Under the Ohlson and Juettner-Nauroth (2005) approach, the implied cost of equity capital (ICE_{OJ}) is defined as follows:

$$ICE_{OJ} = A + \sqrt{A^2 + \left(\frac{eps_t}{P_t}\right) \left[\left(\frac{eps_{t+2} - eps_{t+1}}{eps_{t+1}} \right) (\gamma - 1) \right]} \quad (12)$$

$$A = \frac{1}{2} \left[(\gamma - 1) + \left(\frac{dps_{t+1}}{P_t} \right) \right] \quad (13)$$

where eps_{t+1} and eps_{t+2} are one- and two-years ahead analyst-consensus forecasts of earnings per share, dps_{t+1} is the one-year-ahead analyst-consensus forecast of dividend per share, P_t is the current price, and $(\gamma - 1)$ is the perpetual growth rate at which the short-term growth decays asymptotically. We follow Gode and Mohanram (2003) in setting the $(\gamma - 1)$ equal to the risk free rate minus 3%, which is the long-term inflation rate. If $(\gamma - 1)$ is negative, we set its value

¹ Our use of Sefcik and Thompson's (1986) approach to test market reaction is similar to Comprix et al. (2003), which studies a similar context. However, another study by Armstrong et al. (2006) applies the traditional cross-sectional regression of announcement time of abnormal returns on company characteristics. To address the cross-correlation issue, they implement a separate test to compare announcements with randomly sampled non-announcement returns. Nevertheless, this methodology could not simultaneously address the time-clustering issue along with the research design seeking to test the relationship between market reaction and company characteristics. The Sefcik and Thompson's (1986) approach is directly designed for this purpose.

to zero following Claus and Thomas (2001). Following Chen, Jorgensen, and Yoo (2004), when $\text{eps}_{t-2} > \text{eps}_{t-1}$ we assign short-term earnings growth ($\text{eps}_{t-2} - \text{eps}_{t-1}$) to zero. When the value inside the root is negative, we assume the $\text{ICE}_{(t)}$ = 4. Under the Easton (2004) approach, the implied cost of equity capital ($\text{ICE}_{\text{IFC}_t}$) is calculated as follows:

$$\text{ICE}_{\text{IFC}_t} = \sqrt{\frac{(\text{eps}_{t-2} - \text{eps}_{t-1})}{P_t}} \quad (14)$$

These two models are preferred over the residual-income valuation model applied in Gebhardt, Lee, and Swaminathan (2001) as they do not require clean-surplus assumptions. The value of $\text{ICE}_{\text{IFC}_t}$ is equivalent to $\text{ICE}_{(t)}$ if we assume $(\gamma - 1) = 0$ and $\text{dps}_{t-1} = 0$. Because $\text{ICE}_{\text{IFC}_t}$ requires that $\text{eps}_{t-1} > \text{eps}_{t-2}$, it tends to skew the sample toward growth stocks.

Due to inherent measurement problems associated with the estimation of the cost of equity from historical returns (Fama and French, 1997; Elton, 1999), inferring the cost of equity from analyst forecasts and market prices through accounting-based valuation models has emerged and promulgated in contemporary literature. Although some studies suggest possible weaknesses of such an approach (Easton, 2006; Guay, Kothari, and Shu, 2005) other studies show that their estimates capture common proxies of risk (e.g., Gebhardt et al., 2001; Gode and Mohanram, 2003; Botosan and Plumlee, 2005). In our study, we apply this established methodology to evaluate H1B, which associates our counter-factual proxy of UK firms' willingness to adopt IFRS with long-run changes in the level of market-perceived risk around the decision-making period. It provides a more direct proxy for the impact on firms' cost of equity capital than short-term market reaction tests. As mentioned earlier, tests of both H1A and H1B mutually complement each other and the triangulation of the results suggests a more powerful inference to our research question.

Following Daske (2006), we compute the implied cost of equity capital on a monthly basis from January 1996 to December 1998 (pre-announcement period) and September 2001 to October 2004 (post-announcement period). We calculate the change ($\Delta \text{ICE}_{(t)}$ and $\Delta \text{ICE}_{\text{IFC}_t}$) by subtracting the median implied cost of equity of the pre-announcement period from the median implied cost of equity of the post-announcement period.¹³ To determine the relationship between UK firms' degree of similarity to German voluntary adopters and changes in cost of capital, we run the following cross-sectional regressions:

$$\begin{aligned} \Delta \text{ICE}_{(t)} = & \lambda_0 + \lambda_1 \text{Pr}_j + \lambda_2 \Delta \text{MV}_j + \lambda_3 \Delta \text{BM}_j + \lambda_4 \Delta \text{DM}_j + \lambda_5 \Delta \text{SG}_j \\ & + \lambda_6 \Delta \text{OPM}_j + \varepsilon_j \end{aligned} \quad (15)$$

where $\Delta \text{ICE}_{(t)}$ is the change in implied cost of equity capital of firm j from pre- to post-announcement period, Pr_j is the degree of similarity with German voluntary adopters of firm j (based separately on Models 1, 2, and 3), ΔMV_j , ΔBM_j , ΔDM_j , ΔSG_j , and ΔOPM_j are the changes in three-year median-market value, book-to-market value, debt-to-market value, sales growth, and operating-profit margin, respectively, for firm j from pre- to post-

¹³ Our research design seeks to detect cross-sectional variations at a company-specific level. To achieve this, we need to estimate the changes of implied cost of equity on an individual-company basis instead of using the approach that Easton et al. (2002) suggest.

announcement period.¹⁴ Market value, book-to-market values, and debt-to-market values have been confirmed by previous research to be correlated with implied cost of equity (Botosan & Plumlee, 2005; Chen et al., 2004; Gebhardt et al., 2001; Gode & Mohanram, 2003) and are, therefore, incorporated as control variables. In addition, we control for growth proxied by sales growth and profitability proxied by operating-profit margin. The same regression of Eq. (15) is applied using $\Delta ICE_{Pr,t}$ as a dependent variable. The coefficient λ_1 gives the relationship between Pr and long-run changes in cost of capital, after controlling for changes in various firm-specific attributes over the same period. In H1B we assume that there should be a negative relationship between the Pr and long-run changes in the cost of capital. This is again based on the assumption that higher Pr firms bear greater resemblance to German firms that adopted an international accounting regime and therefore have a net economic benefit upon the adoption of IFRS.

4.4. Key dates

The timeline of events leading to the mandatory adoption of IFRS is crucial for this study. For the event study we need to know the days when the market revised its expectations about IFRS adoption. For the cost of capital study we need to identify a pre-decision period when the issue of IFRS adoption was far from being resolved and a post-decision period when the issue of IFRS adoption was clearly settled.

To narrow down the period when expectations changed we first searched *The Financial Times* and *Accountancy* for all articles related to IFRS between 1st January 1999 and 31st December 2002. 1999 was the first year where commentators began concrete discussions on mandatory IFRS adoption and 2002 was the year the final directive was formally adopted by the council of ministers. This search revealed that after 31 December 2000 most commentators expected mandatory IFRS adoption in the EU by 2005.¹⁵ This is prior to the formal adoption of the directive but consistent with evidence from Binder (1985) that suggests that formal regulatory announcements are generally anticipated in event studies using public announcements. We, therefore, narrowed down the search from 1st January 1999 to 31st December 2000. Seven events appeared relevant. These events are tabulated in Table 1.

Event 1 is the commission's presentation of its preferred option to the Financial Services Policy Group. The preferred option included all the important elements of the final directive. This event was not widely discussed in the *Financial Times* but due to the early stage and the importance of the Financial Services Policy Group this event is included. Thus, we classify Event 1 as favorable.

The year after the first event is the period with most uncertainty. It involved prolonged discussions about the future structure of the International Accounting Standard Committee (IASC, the IASB's predecessor). US stakeholders, among them the Securities and Exchange Commission (SEC), wanted less political influence in the accounting standard-setting process, while the EU commission took the opposite view. The future structure of the IASC was the

¹⁴ We calculate the percentage change for market value.

¹⁵ E.g., KPMG's (2002) comment on the final adoption of the directive: "In June 2002, the Council of Ministers of the European Union adopted the much anticipated regulation requiring all listed groups in the European Union to apply International Financial Reporting Standards (IFRS) in their financial statements by 2005."

Table 1

Events changing the likelihood of mandatory IFRS adoption in the EU

Event	Effect on likelihood	Date	Source	Description
1	Favorable	28/01/1999	FT04/04/1999	The Financial Services Policy Group, representatives of EU finance ministers, were presented with the European Commission's preferred option for accounting harmonization
2	Unfavorable	22/03/2000	IASC website 1)	Preliminary announcement of IOSCO endorsement of IFRS
3	Unfavorable	18/05/2000	FT25/05/2000	Formal IOSCO endorsement of IFRS IOSCO conditional endorsement decreased the likelihood of mandatory IFRS in the EU because it was the culmination of US influence in the IASC (later IASB) as it was connected to a changed structure much as proposed by the FASB and a changed team of trustees with more influence from the US. Furthermore, the OSCO's conditional endorsement was disappointing to the commission because it allows countries a series of opt-outs. Opt-outs that were expected to be used by the US
4	Favorable	09/06/2000	IASC website 1)	Fritz Bolkerstein, EU commissioner, makes a preparatory announcement that IFRS will be proposed as compulsory for all EU-listed companies
5	Favorable	13/06/2000	FT14/06/2000	The European Commission's propose that all listed EU companies should prepare their consolidated financial reports in accordance with IFRS
6	Favorable	17/07/2000	FT17/07/2000	ECOFIN meeting supporting the commission's proposal on this day and Britain calls for the completion of the European single market in financial services to be brought forward
7	Favorable	27/11/2000	FT28/11/2000	PricewaterhouseCoopers survey published. The survey shows support for IFRS among CFOs of European companies

This table presents the events that changed the likelihood of mandatory IFRS adoption in the EU. The events were identified by searching *The Financial Times* (FT) and *Accountancy* from January 1, 1999 to December 31, 2000. The dates shown are the event dates. The two dates marked by 1) are obtained from Comprix et al. (2003). 2) refer to *Financial Times* 25/05/2000 "Brussels' lost voice" for further discussion of the implication of IOSCO endorsement and EU mandating IFRS. Favorable means that the event increased the likelihood of mandatory IFRS in the EU and unfavorable means that the event decreased the likelihood of mandatory IFRS in the EU.

main obstacle for the International Organization of Securities Commissions' (IOSCO) endorsement of IFRS. IOSCO is an organization of securities commissions in the world working to promote high standards of regulation (www.iosco.org). IOSCO endorsement was to be the culmination of the core standard project. A process was begun in 1997, jointly by IOSCO and IASC, to reach a core set of accounting standards to be used for cross-border listings (www.iasb.org). The discussion on structure ended in May 2000 when the IASC decided to follow almost entirely the US proposal for a new structure. In addition to this restructuring, a number of high-ranking positions in the IASC's board of trustees went to US officials. The new structure and the US influence on the board of trustees paved the way for the IOSCO endorsement.¹⁶ The endorsement itself turned out to be only conditional. It allowed

¹⁶ *Accountancy* June 2000, p. 7: "The (core standard) project took a long time, partly because of the SEC's apparent hostility to anything but US GAAP. However, since the IASC finalized its restructuring proposals – in which the SEC played a major role – it seems to have moderated its approach."

countries a number of significant opt-outs.¹ The new structure, the appointment of US trustees, and the weak conditional endorsement lead to a decreased likelihood of mandatory IFRS adoption in the EU. We use the dates of endorsement and expected endorsement as proxies for moves by the IASC toward the US and away from the EU commission. Thus, we classify Event 2 and Event 3 as unfavorable.

The period of uncertainty ended in the second half of 2000 when four announcements made it clear that the EU would proceed with the regulation regardless of the new structure of the IASC and its reduced influence on the board of trustees. In June and July the commission pledged its support first through the responsible commissioner and second by a formal communication. Third, ECOFIN, consisting of the EU fiscal ministers, supported the commission's communication. And fourth, towards the end of 2000 a survey showed strong support among firms in the EU for mandatory adoption of IFRS. We classify Events 4 to 7 as favorable.

Although, all dates of changed likelihood are in 1999 and 2000 we acknowledge that some uncertainty might still have existed at the beginning of 2001. We therefore exclude the first nine months of 2001 in the analysis of long-run changes in the implied cost of capital. We define the pre-announcement period as the 36 months from 01/01/1996 to 31/12/1998 and the post announcement period as the 36 months from 01/10/2001 to 30/09/2004.

When building the counter-factual proxy (in Section 4.1) used to extract the characteristics of voluntary adopters, we need to define a voluntary *commitment* and to connect this definition to the choice of an international accounting regime. Following Leuz and Verrecchia (2000) we define a voluntary commitment as a decision by the firm about what it will disclose before it knows the content of the information. A decision to disclose after the information is known to the firm is a voluntary disclosure. The voluntary adoption of an international accounting regime is a commitment because it is not possible to change back to domestic standards in years where the firm for some reason decides compliance is undesirable.

The strength of a commitment is determined by a combination of how rigid it is and how long into the future the commitment stretches. Thus, a commitment made before the EU decision to require mandatory IFRS is stronger than a commitment made after the decision. This is because the latter only lasted till 2005, whereas the length of the former was unsure at the time it was made. From the above discussion of key dates, we know that most of the uncertainty as to whether IFRS would become mandatory had diminished by the end of 2000.

¹ Accountancy, June 2000, p. 7: "... the US regulator (SEC) still has concerns about the quality of IFRSs and is thought to be behind IOSCO's less-than-wholehearted endorsement." *The Financial Times*, May 25, 2000 p2. "The IOSCO agreement will appear anemic to the Commission. While committing to international standards, the deal permits national regulators several degrees of freedom. They are allowed to require extra disclosure, to apply their own interpretations and to demand items be reconciled to domestic standards Brussels will portray this, with some justification, as an exercise in American ego massaging. The US Securities and Exchange Commission thinks its standards are the best, implying that some IASC rules are deficient by comparison. The pick and choose approach of the IOSCO deal could allow the US to keep its beloved rules more or less intact. The European Commission will perceive similar US dominance in the team of trustees. Mr Volcker is backed up by another regulatory heavyweight in the form of David Ruder, a one-time SEC chairman. None of Europe's seven representatives have held such elevated positions." Paul Volcker was appointed within days of the IOSCO endorsement. The above view is further supported by a commentary in the *Financial Times*. *The Financial Times*, June 6, 2000 p25: "... The Commission is equally critical of the IOSCO deal. It views as disastrous a decision to allow countries a series of opt-outs from global rules. Regulators will have the power to require reinterpretation, greater disclosure and reconciliation to national standards."

The final decision was, however, not formally made before 2002 even if no dates in 2001 and 2002 appear to significantly change the likelihood of mandatory IFRS. Furthermore, the decision to change accounting regime requires a certain period of preparation. KPMG (2002) states that firms need to start the process of transition in 2002 if they are to be ready to comply with IFRS from 2005. Based on these factors we use the accounting-regime choices of German firms in 2002 as the dependent variable in the choice model. That is to say, firms that complied with an international accounting regime no later than 2002 made a commitment before knowing that IFRS would later become mandatory and, therefore, it is assumed that they perceived net economic benefits from committing to comply with IFRS.

Like Comprix et al. (2003), our study differs substantially from Armstrong et al. (2006) in the choice of time frame to extract announcement events. Their market-reaction study is conducted on a set of later events that took place between 2002 and 2004. The events are all related to EFRAG's endorsement of IFRS in general and IAS 32–39 in particular. They argue that these events capture a change in the likelihood of mandatory IFRS. There is no doubt that these events are significant in the process towards mandatory IFRS adoption worldwide, but it is unlikely that they capture any changes in the likelihood of mandatory IFRS adoption in the EU. Firms adopting IFRS on the 1st of January 2005 have 1st of January 2004 as the day of transition (firms with a calendar fiscal year). In order to be able to meet this deadline firms need a certain period of preparation. KPMG estimates that firms adopting in 2005 need to begin preparation in 2002 (KPMG 2002). In addition to this, the final decision to impose mandatory IFRS was made in June 2002 (EC/16.06.2002). Thus it is unlikely that any significant uncertainty as to whether IFRS (except for IAS 32–39) would become mandatory remained in 2003 and 2004.

4.5. The German sample

The German sample is based on all existing and dead firms available from Datastream. We exclude financial institutions, firms with negative common equity, preferred shares, foreign firms, and those cross-listed on a non-German stock exchange. Since cross-listed firms are often required to provide higher-quality disclosure, their motive, cost, and benefit of adopting IFRS voluntarily are likely to be different from the rest of the firms in our German sample. Apart from that, since the UK-GAAP demands relatively higher disclosure standards than the HGB, the impact of involuntary disclosure due to cross-listing is higher for German than UK firms. This in turn leads to a disparity in the perceived benefit of IFRS adoption between firms from these two countries that are cross-listed abroad. Thus, the inclusion of cross-listing in the *Pr* value estimation is likely to pick up effects that are neither comparable nor transferable between the two samples. Following Daske (2006) and Karamanou and Nishiotis (2005) we should be concerned with the quality of information on accounting standards in commercial databases. The possibility of errors is largest for domestic standards, because a classification identical to the year before rarely results in an error when the firm already complies with an international accounting regime. This is because firms rarely switch from international to domestic standards. The opposite is not true. We, therefore, test all German firms classified as domestic-standard firms in their annual reports for 2002. For firms classified as complying with IFRS or US-GAAP we match the Compustat classification to the Datastream classification and check all data that do not agree with the annual reports for 2002. If we

are unable to find the annual report for 2002 in Thompson One Banker we classify the accounting-standards variable for that firm as missing. The data for all other variables in Eqs. (1), (2) and (3) are obtained from Datastream. The final German sample size for Models 1, 2,

Table 2
Descriptive statistics for the UK and Germany

Panel A: Descriptive statistics on firm-specific characteristics for Models 1 and 2

		Germany				UK							
						IBES sample				Full sample			
		OBS	FS	DTM	LMV	OBS	FS	DTM	LMV	OBS	FS	DTM	LMV
Model 1	Mean		35.0%	14.5%	11.8		24.3%	14.4%	12.0		23.2%	11.7%	11.2
	Median		34.1%	13.7%	11.7		15.2%	8.7%	12.1		9.2%	6.0%	11.1
	Standard deviation		27.5%	17.1%	1.6		26.4%	14.0%	1.5		31.0%	14.1%	1.7
	Sample size	389				469				1310			
Model 2	Mean		34.9%	14.6%	11.8		24.3%	14.4%	12.0		23.2%	11.7%	11.2
	Median		33.6%	7.6%	11.7		15.2%	8.7%	12.1		9.2%	6.0%	11.1
	Standard deviation		27.6%	17.1%	1.6		26.4%	14.0%	1.5		31.0%	14.1%	1.7
	Sample size	382				469				1309			

Panel B: Descriptive statistics on industries (Model 3 only)

Industry (Worldscope classification)	Germany		UK			
			IBES sample		Full sample	
	OBS	n	OBS	n	OBS	n
Resource/utility (5200, 5800, 8200)	3	4	16	3	230	9
Electronics (3700, 4000)	104	17	74	16	377	15
Construction/manufacture (1300, 1600, 1900, 2500, 2800, 4900, 5500, 6100, 7300)	168	27	139	30	547	22
Retail/Transport/Media (6400, 7000, 7900)	40	6	62	13	265	10
Non-cyclical consumer goods (2200, 4600, 7600)	35	6	24	5	101	4
Drugs/healthcare (3400)	16	3	18	4	85	3
Other (3100, 6700, 8500, 8800)	231	37	136	29	933	37
Total	623	100	469	100	2538	100

Panel C: German firms' accounting-standard choice

	Model 1		Model 2		Model 3	
	OBS	n	OBS	n	OBS	n
Adopter						
IFRS	129	33	126	33	216	35
US-GAAP	70	18	66	17	114	18
	199	51	192	50	330	53
Non-adopters (HGB)	190	49	190	50	293	47

(continued on next page)

Table 2 (continued)

Panel D: Descriptive statistics for the counter-factual proxy of UK firms' willingness to adopt IFRS (Pr)		Model 1	Model 2	Model 3
IBES sample	Mean	0.48	0.49	0.51
	Median	0.47	0.48	0.45
	Standard dev.	0.17	0.26	0.21
Full sample	Mean	0.43	0.45	0.53
	Median	0.41	0.43	0.63
	Standard dev.	0.26	0.26	0.19

This table shows the sample size and descriptive statistics on the data used to estimate the logistic regression models of voluntary adoption of international accounting regimes (IFRS/US-GAAP) in Germany and to calculate the counter-factual proxy (i.e., the likelihood of voluntary adoption) in the UK. Firm characteristics such as foreign sales (FS), leverage (DTM), and size (LMV) are measured as the five-year mean from 1998 to 2002. Industry dummies are assigned based on industry groups from Worldscope. Panel A presents the sample for Models 1 and 2 and Panel B provides the sample for Model 3. OBS is the sample size. FS is calculated as the foreign sales to total sales. DTM is calculated as long-term debt (long-term debt + market capitalization). LMV is the natural logarithm of market value. Panel C describes the accounting-standard choice of German firms in the sample used in building the logistic regression models. Panel D presents the distribution of the counter-factual proxy of willingness to adopt IFRS among UK firms (Pr). IBES sample is applied to test of H1B. Full sample is only applied to test of H1A.

and 3 are 403, 386, and 641, respectively. Table 2 shows the size and relevant descriptive statistics for the German sample. Table 2 panel C describes the accounting standards that the German firms in our sample use in 2002 across the three models. Firms are equally divided between adopters and non-adopters. For instance, adopters account for 51%, 50%, and 53% in the dependent variable of the logistic regressions in Eqs. (1), (2), and (3) (Models 1, 2, and 3), respectively. This even distribution ensures that we do not skew heavily toward either adopters or non-adopters in our estimation.

4.6. The UK sample

Our UK sample is based on all existing and dead UK firms in Datastream. To construct the full UK sample, we exclude financial institutions, firms with negative book value of equity, preferred stocks, foreign firms, and those cross-listed on a non-UK stock exchange. The purpose of the latter criteria is to address the issue that cross-listed firms are already under more scrutiny from foreign investors and analysts. Thus, the costs and benefits that cross-listed firms incur from mandatory IFRS adoption is not comparable with the average firms in our UK sample. However, in Section 5.5.3 we re-introduce ADR firms into the UK sample for robustness check. A relatively small number of firms that already complied with either US-GAAP or IFRS are also excluded.¹⁸ The data for foreign sales, leverage, and size used to compute the counter-factual proxy in Eqs. (4), (5) and (6) are from Datastream. For Models 1, 2, and 3 we have 1310, 1309, and 2538 observations, respectively. As discussed in

¹⁸ Compliance with IFRS or US-GAAP prior to 2005 is only possible by supplementary reporting (i.e. producing two sets of financial statements), thus imposing additional costs on the issuer.

Sections 4.2 and 4.3, we apply two sets of tests on the UK firms. The market-reaction test of the H1A can be implemented using the full sample. We obtain the daily returns of the individual firms and the Financial Times All Share Index from Datastream. The test of H1B imposes additional data constraints. To measure changes in implied cost of equity over the pre-announcement (January 1996 to December 1998) and post-announcement (September 2001 to October 2004) periods, we obtain analyst-earnings forecasts and actual current price from the IBES. The data to compute changes in other control variables over the pre- and post-announcement periods, i.e., size, book-to-market value, leverage, sales growth, and operating profit margin in Eq. (15), are from Datastream. This results in a reduced common sample of 469 observations. Panels A and B of Table 2 present the sample size and relevant descriptive statistics for the UK sample applied in our study. In comparison to the German sample, the level of dependence on foreign revenue appears smaller in the UK, although the difference is not significant. In terms of leverage and size, our samples for these two countries are fairly similar. Table 2 panel D describes the counter-factual proxy of willingness to adopt IFRS. Mean and median are both close to 50%, suggesting a fairly equal distribution. This ensures that our subsequent tests are not conducted on UK samples that are heavily skewed toward firms that are either very similar or different in characteristics to German voluntary IFRS adopters.

5. Empirical findings

5.1. *The counter-factual proxy*

Table 3 presents the results of the logistic regression models (Eqs. (1)–(3)) we use to extract the characteristics of German voluntary adopters.

The results of Model 1 suggest that large firms with a low level of debt financing and a large foreign exposure are most likely to adopt an international accounting regime voluntarily. This is consistent with existing studies on voluntary commitments. For instance, Cuijpers and Buijink (2005) and Dargemidou et al. (2006) argue that larger firms tend to have lower disclosure costs. Meek et al. (1995) suggest that there is a greater demand for information and need for disclosure among large firms due to their higher political and agency costs. Tarca (2004) argues that higher foreign-sales firms have greater need to disseminate information abroad due to their exposure to foreign operations and capital markets. Tarca (2004) also suggests that firms with lower leverage depend more on equity capital and, therefore, have a greater need to reduce information asymmetry. Following the hypotheses developed in Section 3, we expect that firms with these characteristics have the largest net-benefit of mandatory IFRS adoption in the UK. In Model 2, the addition of industry dummies subsumes the relationship between voluntary adoption and leverage. This is not surprising since capital structures are known to be industry-specific. Another possible reason is that leverage may be jointly capturing the influence of a firm's dependence on equity financing as well as its corporate-governance structure. The latter effect in the leverage variable may be subsumed by the industry dummies since corporate-governance mechanisms are documented to be industry-specific (e.g., Agrawal and Knoeber, 2001; Gillian et al. 2003). However, as described in Footnote 12, the leverage coefficient is biased towards zero; we, therefore, keep leverage in Eq. (2). Model 3 applies only the industry dummies. Notice that the Electronics and

Table 3

Characteristics of German early adopters of international accounting regimes (IFRS or US-GAAP)

Variables	Predicted sign	Model 1	Model 2	Model 3
FS	+	2.0685 [5.01]	2.002 [3.91]	
DTM		–2.6003 [–3.68]	–1.1696 [–1.59]	
LMV	+	0.2630 [3.40]	0.3908 [3.89]	
Resource/utility	+		–1.6459 [–2.64]	–0.7300 [–1.84]
Electronics	+		0.4025 [1.03]	0.6816 [2.53]
Construction/manufacture	+		–1.6030 [–5.01]	–1.0587 [–5.04]
Retail/transport/media	+		–1.4058 [–2.29]	–1.2533 [–3.44]
Non-cyclical consumer goods	+		–3.8042 [–4.01]	–3.3257 [–4.49]
Drugs/health care	+		NA	2.1857 [2.10]
Intercept	+	3.4120 [–3.77]	–4.3002 [–3.80]	0.5224 [3.84]
Pseudo R ²		0.1143	0.2425	0.1274
Observations		389	382	623

This table presents the results of the logistic regression models of German firms' accounting-regime choice with *t*-statistics (in brackets). The dependent variable is set to one for German voluntary IFRS/US-GAAP adopters and zero otherwise and the independent variables are firm characteristics (Model 1), both firm-specific characteristics and industry dummies (Model 2), and industry dummies only (Model 3). FS is foreign sales to total sales. DTM is long-term debt (long-term debt + market value). *LMV* is the natural logarithm of market value. See Table 2 for the Worldscope industry-classification code for the industry dummies. In Model 2, there is no observation for the Drug/healthcare firms because they all complied either with IFRS or US-GAAP.

Drug/Healthcare industries are significantly associated with voluntary adoption. This may be capturing the adoption of non-domestic standards by the high-tech growth firms listed in the *Neuer Markt* of Germany.

5.2. Market reaction

Table 4 presents the abnormal stock returns over three alternative window periods for portfolios based on UK firms during public announcements of events that changed the probability of mandatory IFRS adoption in the EU, i.e., the test of H1A.

We apply the Sefcik and Thompson (1986) approach and weight the UK firms' portfolios (Eqs. (8)–(10)) by their *Pr* values, which are the counter-factual proxies (Eqs. (4)–(7)) measuring UK firms' willingness to adopt IFRS (Eqs. (1)–(3)). We run a time-series regression of the UK *Pr* weighted portfolios' return on the market portfolio return proxied by FT All Shares Index and a set of event dummies representing the window periods covering each of the seven sampled events (Eq. (11)). The market-portfolio return controls for systematic risk and the event dummies capture the risk-adjusted abnormal

returns pertaining to the corresponding event windows. These risk-adjusted abnormal returns are conditional on the Pr values through the portfolio weights. The event dummies are set to one (–1) for announcements that are favorable (unfavorable) to mandatory IFRS adoption in the EU and zero otherwise. For brevity, we only show the coefficients and t -statistics for the event dummies. The last column is based on a dummy variable that combines the values of all seven events. This enables us to make a joint inference that aggregates the net effect of Pr on market reaction across all seven events.

Panels A, B, and C of Table 4 show the results of the tests for days –1, 0, 1, days –1, 0, and day 0, respectively, across the full sample. Across all panels of Table 4 the portfolio weighted on Pr values calculated from Model 1 (Eq. (4)) has a significantly positive relationship with the net risk-adjusted abnormal returns of all sampled events as shown in the last column. The net risk-adjusted abnormal returns of this particular portfolio are 0.672%, 0.718%, and 0.485% in panels A, B, and C, respectively. These findings provide evidence in support of H1A by indicating that UK firms with higher Pr values, i.e., the degree of similarity with the German voluntary adopters, are associated with significantly higher market reactions relative to their lower Pr counterparts. To evaluate the role of the industry effect in the share-price response, we construct Models 2 and 3 (Eqs. (5) and (6)). (The former adds industry dummies into Model 1 and the latter contains only the industry dummies.) The net risk-adjusted abnormal returns for the portfolio weighted on Model 2 Pr are insignificant in panel C and only marginally significant in Panels A and B. The net risk-adjusted abnormal returns for the portfolio weighted on Model 3 Pr are statistically insignificant throughout all three panels. The general observation in Table 4 is that industry dummies only seem to add noise to our analyses of the UK sample despite the finding in Table 3, which shows that in the German sample industry membership has explanatory power for voluntary IFRS adoption.

We argue that a firm's willingness to adopt IFRS may be determined by factors that are common across countries as well as factors that are country-specific due to institutional differences. Our finding in Table 4, that the Pr values based on Model 1 are associated with significant net-market reactions, suggest that foreign sales, size, and leverage are common factors in both Germany and the UK. The observation that Pr values incorporating industry dummies in Models 2 and 3 exhibit a weaker association with abnormal returns could be due to the possibility that the industry effects are correlated with country-specific factors that are only applicable in Germany and not in the UK. We argue that this may be the case because the industry effects may be capturing the influence of corporate-governance structure on the adoption of IFRS by German firms. As shown in Table 3, the association between IFRS adoption in Germany and firm leverage, which is often applied to capture corporate governance structure (e.g., Cuijpers & Buijink, 2005), is weakened in the presence of industry dummies. This provides weak evidence that the industry effect captures cross-sectional variations in governance structure of German firms and corroborates existing studies that document such relationship (e.g., Agrawal & Knoeber, 2001; Gillian et al., 2003).

In terms of individual events, notice that the portfolios weighted in Model 1 Pr have a consistently and significantly positive relationship with risk-adjusted abnormal returns associated with Event 1. According to Table 1, this is the day when the Financial Services Policy Group, comprised of representatives of the EU finance ministers, were presented with

the European Commission's preferred option for accounting harmonization. This is our earliest sampled major announcement with favorable implications for the EU decision to impose mandatory IFRS adoption. Events 2 and 3 are considered to have unfavorable implications for mandatory adoption of IFRS. We expect the Pr value to be negatively

Table 4

Abnormal stock returns of UK firms conditional on their degree of similarity to German voluntary IFRS adopters during announcements of decisions to impose mandatory IFRS adoption in the EU

Events	1	2	3	4	5	6	7	Net
Dates	28-01-1999	22-03-2000	18-05-2000	09-06-2000	13-06-2000	17-07-2000	27-11-2000	
Effect	Favorable	Unfavorable	Unfavorable	Favorable	Favorable	Favorable	Favorable	
Panel A: Window -1,0,1								
Model	0.01117	0.01386	0.01204	0.00453	-0.00272	0.00725	-0.00311	0.00672
1 Pr	[4.59]	[1.97]	[4.28]	[1.16]	[-1.07]	[6.26]	[-0.96]	[3.14]
Model	0.00344	0.01471	0.01644	0.00362	0.00665	0.01074	-0.01282	0.00488
2 Pr	[3.78]	[2.13]	[4.48]	[1.31]	[3.87]	[10.31]	[-2.51]	[1.77]
Model	-0.00845	0.02054	0.02126	0.00328	0.00898	0.01396	0.02309	0.00351
3 Pr	[-6.20]	[2.04]	[6.64]	[2.58]	[-4.54]	[4.21]	[-2.38]	[0.84]
Panel B: Window -1,0								
Model	0.01381	0.01590	0.00934	0.00459	-0.0057	0.00867	0.00134	0.00718
1 Pr	[8.74]	[1.55]	[3.62]	[1.18]	[-10.48]	[12.46]	[1.98]	[2.55]
Model	0.00434	0.01947	0.01298	0.00374	-0.00833	0.00948	-0.00570	0.00573
2 Pr	[6.94]	[2.31]	[3.59]	[1.36]	[-6.84]	[13.91]	[-8.60]	[1.84]
Model	0.00872	0.02762	0.01974	0.00345	0.01093	0.00945	-0.00953	0.00527
3 Pr	[-4.86]	[2.27]	[4.60]	[2.76]	[-9.39]	[10.12]	[-10.55]	[1.11]
Panel C: Window 0								
Model	0.01592	0.00154	0.01284	-0.00072	-0.00569	0.00868	0.00136	0.00485
1 Pr	[28.87]	[2.87]	[20.98]	[-1.21]	[-10.26]	[12.47]	[2.00]	[1.76]
Model	0.00487	0.00759	0.01794	0.00007	-0.00981	0.00951	-0.00567	0.00353
2 Pr	[9.09]	[14.31]	[30.25]	[0.11]	[-18.23]	[13.93]	[-8.56]	[1.07]
Model	0.00628	0.01044	0.02552	0.00228	0.00950	0.00950	-0.00944	0.00327
3 Pr	[-8.75]	[14.55]	[31.89]	[2.58]	[-13.17]	[10.20]	[-10.44]	[0.72]

This table presents the abnormal stock returns and *t*-statistics (in brackets) of UK firms during announcements of mandatory IAS adoption in the EU based on the Sefcik and Thompson (1986) weighted portfolio approach over the test period of 01-01-1999 to 31-12-2000. The portfolios are weighted by the counterfactual proxy for willingness to adopt IFRS based on three models. Each model is estimated using a German sample where the dependent variable is set to one for German voluntary IFRS/US-GAAP adopters and zero otherwise and the independent variables are firm characteristics, which include foreign sales, leverage, and size (Model 1), both firm characteristics and industry dummies (Model 2), and industry dummies only (Model 3). The time-series returns of the weighted portfolios are regressed over the test period on market portfolio returns proxied by FT All Shares Index and a set of event dummies representing the window period covering each of the seven sampled events. The event dummies are set to one(-1) for announcements that are favorable (unfavorable) to mandatory IAS adoption in the EU and zero otherwise. Each column shows the coefficients estimated for the corresponding events and the *t*-statistics adjusted for heteroskedasticity. The last column is based on a dummy variable that combines the values of all seven events. Panel A shows the results when a three-day event window is used (-1,0,1). Panel B shows the results when a two-day event window is used (-1,0) and panel C shows the results when only the actual event day is used (0).

associated with market reaction to these cases. By setting the corresponding event dummies to 1 over the measurement windows, the anticipated negative relationships will appear with positive signs in our analysis. Notice that portfolios weighted on the Pr values calculated from all three models yields a significantly positive relationship with the risk-adjusted abnormal returns associated with Event 3 across all three panels. The results for Event 2 are also mostly significantly positive. These findings confirm that UK firms with higher similarity to German voluntary IFRS adopters experience a market reaction that is relatively more negative (for events 2 and 3) than those with lower Pr values. Events 4 to 7 are all considered to be favorable to EU mandatory IFRS adoption. Nevertheless, their results are generally mixed as they vary across event windows and models. In particular, events 5 and 7 are generally associated with negative returns contrary to our expectations. However, it is not uncommon in studies that use public announcement dates to observe that the ability of events to capture changes in expectations tend to decrease through time and that some events are associated with returns that are counter intuitive (e.g., Armstrong et al., 2006, Table 5 panel A). This is due to the challenge of identifying events that only change expectations regarding the issue under investigation and the tendency of later announcements only to re-confirm their earlier counterparts. Therefore, we focus our primary inference on the net effect and restrict the discussion of individual events to the robustness tests in Section 5.3.3.

5.3. Robustness tests of market reaction

To enhance the robustness of our findings in Table 4 we conduct additional tests on the relationship between our counter-factual proxy for the willingness to adopt and short term market-reaction tests. First, we examine if our findings also hold in the intersection sample with IBES, which we use in Sections 5.4 and 5.5 to test long-run changes in cost of equity for H1B. Second, we apply an alternative approach to further control for possible correlation with industry membership. Third, we examine the sensitivity of the results to the identification of specific events. Finally, we regress the market reaction on each characteristic of Model 1 in order to establish whether the results are driven entirely by one of the three characteristics.

5.3.1. IBES intersection sample

As explained in Section 4.6, our tests of short-run market reaction in Table 4 are based on a full sample while tests of long-run changes in cost of equity are based on a smaller sample subject to IBES data-availability constraints. We also implement the market-reaction test using the IBES sample for two reasons. First, if the short-run market reaction (H1A) and long-run changes in cost of equity (H2B) tests are to be mutually complementary, then the findings for the former based on a larger sample should also hold in the smaller sample in which we test the latter. Second, if the market-reaction results also exist in the IBES intersection sample, this will mitigate the possibility that our findings in Table 4 are driven by smaller firms not covered by the IBES database. In Table 5 panel A, we show that the relationship between announcement returns and the counter-factual proxy (Pr) estimated from firm-specific characteristics (Model 1, Eq. (4)) holds even in the smaller IBES sample. Notice that the net risk-adjusted abnormal returns in the last column is 0.586% and statistically significant.

Table 5

Robustness test of the connection between the similarity to German voluntary IFRS adopters and abnormal stock returns

Panel A: IBES sample								
Events	1	2	3	4	5	6	7	Net
Model 1 Pr	0.00921 [2.66]	0.01441 [1.40]	0.01698 [3.54]	0.00753 [-12.70]	0.00606 [-6.15]	0.01011 [2.71]	0.00211 [-0.53]	0.00586 [1.95]
Panel B: Controlling for industry effects								
Events	1	2	3	4	5	6	7	Net
Model 1 Pr	0.01386 [5.52]	0.01070 [2.08]	0.00577 [3.62]	0.00327 [0.99]	-0.00068 [-0.55]	0.00171 [1.67]	0.00380 [3.35]	0.00593 [3.71]
Panel C: Net abnormal returns excluding individual events								
Event excluded	1	2	3	4	5	6	7	
Model 1 Pr	0.00580 [2.37]	0.00533 [2.71]	0.00572 [2.34]	0.0086 [2.96]	0.00858 [3.87]	0.00663 [2.76]		0.00793 [3.62]
Panel D: Portfolios build on individual characteristics								
	MV			DTM			FS	
Window -1, 0, 1	0.00077 [2.91]			0.00315 [-0.75]			0.00166 [1.67]	
Window -1, 0	0.00061 [1.83]			0.00427 [-0.85]			0.00279 [3.00]	
Window 0	0.00026 [0.72]			-0.00323 [-0.81]			0.00299 [4.13]	

This table presents the abnormal stock returns and *t*-statistics (in brackets) of UK firms during announcements of mandatory IAS adoption in the EU based on the Sefcik and Thompson (1986) weighted portfolio approach over the test period of 01/01/1999 to 31/12/2000. Panel A provides the results over the days -1, 0, 1 window of the seven events and their net effect for the portfolio weighted by Pr value that is estimated from Model 1 (Eq. (4)) using the IBES sample. Panel B provides the results over the days -1, 0, 1 window of the seven events and their net effect for the portfolio weighted by Pr value that is estimated from Model 1 (Eq. (4)) using the full sample. In this case, 25 industry dummies based on Worldscope classification are applied during the formation of the weighted portfolio to control for industry effect (see Section 5.3.2). Panel C provides the results over the days -1, 0, 1 window for the net effect after excluding each of the seven individual events in turn for the portfolio weighted by Pr value estimated from Model 1 (Eq. (4)) using the full sample. Panel D shows the results over days -1, 0, 1, days -1, 0, and day 0 windows of the net effect of all seven events for portfolios weighted by market capitalization (MV), leverage (DTM) and foreign sales (FS) using the full sample. In Panels A to D, the time series daily returns of the weighted portfolios over the test period are regressed on market portfolio returns proxied by FT All Shares Index and a set of event dummies representing the test window for each of the seven sampled events. The event dummies are set to one (-1) for announcements that are favorable (unfavorable) to mandatory IFRS adoption in the EU and zero otherwise. All *t*-statistics have been adjusted for heteroskedasticity.

5.3.2. Alternative control for industry effects

The analyses in Section 5.2 indicate that the association between Pr value and announcement returns is more pronounced when the former is estimated only with firm-specific characteristics, i.e., Model 1 (Eq. (4)). This relationship deteriorates once industry membership is incorporated into the Pr estimation. As mentioned earlier, it is possible that

the industry effect is capturing factors correlated with governance, which is more important in determining IFRS adoption choice in Germany and, therefore, less transferable to the UK setting. To rule out the possibility that the announcement returns associated with the *Pr* value that we proxied by firm-specific characteristics are driven by industry effects, we address the influence of industry membership in the construction of weighted portfolios under the Sefcik and Thompson (1986) approach. To implement this, we add 25 industry dummies based on Worldscope classification to the *F* matrix in Eq. (8) so that the portfolio weights generated in W'_{jt} of Eq. (9) account for information pertaining to the *Pr* value based on Model 1 that is orthogonal to industry effects. Table 5 panel B presents the market-reaction tests based on this alternative industry-control approach for the days $[-1, 0, 1]$ window across the seven events individually and the net effect. The results are broadly consistent with those in Table 4. The last column, showing a net risk-adjusted abnormal return of 0.593%, is significant at the 1% level. Thus, our short-run market-reaction test for H1A remains robust even when controlling for industry effects.

5.3.3. Sensitivity to individual events

The market-reaction study of this paper is similar to Comprix et al. (2003) and Armstrong et al. (2006), in that it relies on identifying events that changed the likelihood of mandatory IFRS in the EU. In this study we argue that expectations regarding mandatory IFRS adoption in the EU were formulated mainly in 1999 and 2000 based on the arguments we presented in Section 4.4. Comprix et al. (2003) use events from 2000 to 2002 but conclude that their empirical evidence shows that only those events that were early in this period had significant news content. In the intersect period of 2000 we identify the same events but we interpret the events where IOSCO endorsed IFRS conditionally (Events 2 and 3) as unfavorable, which is different in direction to Comprix et al. (2003). Our classification builds on comments in the Financial Times in the weeks around the conditional endorsement as described in Section 4.4.¹⁹ We believe our identification and classifications of events is correct but acknowledge that some events are open to interpretation. To ensure the robustness of our results, we exclude each of the seven events in turn from our analyses. Table 5 panel C shows that regardless of which event is excluded, the net market reaction remains statistically significant to at least the 5% level. In other words, our findings in Table 4 are not driven by any individual event. Even when we exclude Events 2 and 3 simultaneously, the net market reaction remains significant at the 10% level (and at the 1% level when we control for industry effects). For brevity we do not tabulate these additional results.

5.3.4. Sensitivity to individual components

In this study we have chosen to characterize a firm by its similarity to a German voluntary adopter by using the *Pr* value as a measure of similarity. Recall that the *Pr* estimated from Model 1 (Eq. (4)) consists of three components: i.e., market capitalization, leverage, and foreign sales. Our analyses in Table 3 show that these firm-specific characteristics are significantly associated with voluntary adoption in Germany. In using the *Pr* value, we essentially capture information contained in these components as well as their

¹⁹ See Financial Times the 25th May 2000, p. 2, "Brussels' lost voice" for a more detailed discussion of the implication of events in this period.

relative weights in determining voluntary adoption. To determine whether the relationship between Pr value and announcement returns is dominated by an individual component, we construct weighted portfolios based on these firm-specific characteristics and conduct market-reaction tests using the Sefcik and Thompson (1986) approach. To implement this, we substitute the Pr vector in the F matrix of Eq. (8) with vectors of the values of market capitalization, leverage, and foreign sales. This results in three separate sets of portfolio weights in the W matrix of Eq. (9). Table 5 panel D, summarizes the results of the net abnormal returns across all events associated with each specific characteristic from the main model. Notice that the coefficients of market capitalization and foreign sales are positive and the coefficients for leverage are negative. Thus, the direction of the relationship between the net market reaction and each of these component variables in panel D of Table 5 is consistent with the direction of their association with voluntary non-local GAAP adoption in Table 3. This implies that all three components contribute to the overall effect captured by the Pr value in the expected direction.²⁰ In terms of statistical significance, the foreign-sales and market-capitalization components vary in degrees depending on the test windows. The leverage component is not significant in any test windows. The fact that the Pr value is more powerful than its individual components in capturing market reaction implies that it contains information associated with voluntary non-local GAAP adoption beyond these components and it is not driven by any of them individually.

In summary, the results of the short-term market reactions support H1A. Firms with a high willingness to adopt voluntarily experience a positive (negative) market reaction on days that increased (decreased) the likelihood of mandatory IFRS, although the strength of the evidence depends on assumptions made in connection to events that changed the likelihood of mandatory IFRS. As described earlier, the drawbacks to short-run market-reaction tests are the identification and classification of events. Thus, to increase the robustness of our conclusion, in the next section we test a parallel hypothesis, H1B, using a different methodology that does not rely on identifying specific events.

5.4. Long-run changes in the cost of equity

Table 6 presents descriptive statistics on the changes between the pre-(January 1996 to December 1998) and post-(October 2001 to September 2004) decision periods in the implied cost of equity and control variables used for the analysis of the long-term effect of mandatory IFRS.

The descriptive statistics reveals a general upward time trend in the implied cost of equity, since the changes from the pre to the post period are significantly positive when measured in both the Ohlson and Juettner-Nauroth (2005) abnormal earnings valuation model (ΔICE_{OH}) and the Easton (2004) PEG valuation model (ΔICE_{PE}). This time trend is consistent with the findings of Daske (2006) in a German sample, Lee, Ng, and Swaminathan (2004, Table 1) in G7 countries, and Botosan and Plumlee (2005, Fig. 1) in the US. Changes to the proxies for size (ΔMV) and profitability (ΔOPM) are insignificant. On the other hand, increases in book-to-market value (ΔBM) and debt-to-market value

²⁰ We also applied industry control based on 532 and obtained similar results.

Table 6
Descriptive statistics on changes in implied cost of capital and control variables

	$\Delta ICE_{(t)}$	$\Delta ICE_{Pr,t}$	ΔMV	ΔBM	ΔDTM	ΔSG	ΔOPM
Mean	0.028	0.036	0.004	0.304	0.156	-23.359	1.951
StDev	0.173	0.116	0.095	0.546	0.426	84.263	81.891
t-statistics (Mean)	3.505	6.721	0.912	12.058	7.931	-6.003	0.516
Observations	469						

This table present descriptive statistics on changes in the calculated implied cost of equity according to the Ohlson and Juettner-Nauroth (2005) abnormal earnings growth model ($\Delta ICE_{(t)}$) and the Easton (2004) PEG model ($\Delta ICE_{Pr,t}$). ΔMV is relative change in the natural logarithm of market value. ΔBM is the change book-to-market value. ΔDTM is the change in long-term debt to market value. ΔSG is the change in sales in growth. ΔOPM is the change to the operational margin. The changes are calculated as the difference in a 36 month median between the pre-announcement period (January 1996 to December 1998) and post-announcement period (October 2001 to September 2004).

(ΔDM) and decreases in sales growth (ΔSG) are significant, which indicate a decline in growth and a rise in borrowing between the pre- and post- decision periods.

Table 7 presents the results of the analysis on long-run changes in implied cost of equity subsequent to the decision to impose mandatory IFRS adoption across the EU.

We apply cross-sectional regressions (Eq. (15)) of changes in implied cost of equity capital ($\Delta ICE_{(t)}$ or $\Delta ICE_{Pr,t}$) on the Pr, which is the counter-factual proxy for willingness to adopt IFRS controlled by relative changes in market value, changes in book-to-market value (ΔBM), changes in debt-to-market value (ΔDTM), changes in sales growth (ΔSG), and changes in operating profit margin (ΔOPM). The dependent variables and control variables are calculated as their difference in three-year median value between pre- and post-decision periods. The Pr value is calculated based on Models 1 and 2, where the former is based only on firm characteristics and industry dummies are added to the latter. Model 3 is excluded for brevity since its performance is weak as shown in Table 4. Panels A and B presents the results based on $\Delta ICE_{(t)}$ and $\Delta ICE_{Pr,t}$, respectively as the dependent variable.

In both panels A and B of Table 7, the intercepts of all regressions are significantly positive, which confirms the background upward trend of implied cost of equity capital (e.g., Daske, 2006). In panel A, the long-run changes in the implied cost of equity capital obtained from the Ohlson and Juettner-Nauroth (2005) abnormal earnings growth model have a significantly negative relationship with the Pr value estimated from Model 1, which is evidence in support of H1B. This relationship is significant both before and after the addition of control variables, indicating the robustness of our findings. Panel B shows that the coefficients for the Pr value in Model 1 are also significantly negative when using the Easton (2004) PEG valuation model. This result is also significant in both univariate and multivariate regressions, indicating our findings are robust even to changes in proxies of implied cost of equity. In general, the results in Table 7 demonstrate that UK firms that share similarities in foreign sales, leverage, and size with the German early adopters have significantly lower increases in the cost of capital between the pre- and post-decision periods. The results are not subsumed by control variables that correlate with the implied cost of equity. Since two of these control variables, leverage and size, are components of the Model 1 itself, this implies that the significant relationship between Pr and changes in implied cost of equity are not simply driven by changes in the values of these two

Table 7

Changes in implied cost of equity capital of UK firms conditional on their degree of similarity to German voluntary IFRS adopters following the decision to impose mandatory IFRS adoption in EU

	Intercept	Pr	ΔMV	ΔBM	ΔDTM	ΔSG	ΔOPM
<i>Panel A: ΔICE_{ijt}</i>							
Model 1	0.07903 [4.04]	-0.10642 [-3.01]					
	0.07382 [3.69]	-0.09826 [-3.08]	-0.52616 [-5.00]	0.01809 [-0.87]	0.03086 [2.74]	-0.00000 [-0.01]	-0.00008 [-0.93]
Model 2	0.03436 [2.78]	-0.01297 [-0.63]					
	0.03921 [2.78]	-0.00952 [-0.52]	-0.52285 [-4.91]	-0.01660 [-0.78]	0.03436 [2.96]	0.00000 [0.01]	-0.00007 [-0.79]
<i>Panel B: ΔICE_{ijt}</i>							
Model 1	0.06867 [3.79]	-0.06867 [-2.10]					
	0.06272 [3.49]	-0.05876 [-2.10]	-0.56048 [-5.66]	-0.01881 [-0.93]	0.02250 [2.25]	-0.00004 [-0.49]	0.00004 [0.47]
Model 2	0.03384 [3.02]	0.00368 [0.19]					
	0.03036 [2.90]	0.00787 [0.48]	-0.56029 [-5.64]	-0.01862 [-0.91]	0.02484 [2.42]	-0.00004 [-0.48]	0.00004 [0.55]

This table presents the coefficient and *t*-statistics (in brackets) of cross-sectional regressions of changes in implied cost of equity on the degree of similarity to German voluntary adopters (Pr) controlled by changes in market value (ΔMV), changes in book-to-market value (ΔBM), changes in debt-to-market value (ΔDTM), changes in sales growth (ΔSG), and changes in operating profit margin (ΔOPM). The implied cost of equity is calculated based on the Ohlson and Juettner-Nauroth (2005) abnormal earnings valuation model (ΔICE_{ijt}) in panel A and the Easton (2004) PEG valuation model (ΔICE_{ijt}) in Panel B. The changes in implied cost of equity and control variables are calculated as the difference in a 36-month median between the pre-announcement period (January 1996 to December 1998) and post-announcement period (October 2001 to September 2004). The Pr value is calculated based on two models. Each model is estimated using a German sample where the dependent variable is set to one for German voluntary IFRS US-GAAP adopters and zero otherwise and the independent variables are firm characteristics, which includes foreign sales, leverage, and size (Model 1) and both firm characteristics and industry dummies (Model 2). The *t*-statistics are adjusted for heteroskedasticity.

components between the pre- and post-decision periods.²¹ Although Daske (2006) and Cuijpers and Buijink (2005) did not confirm a significant decrease in cost of equity subsequent to adoption, our study shows that UK firms sharing similar characteristics to German voluntary adopters experienced a significantly lower increase in their cost of equity subsequent to the decision of mandatory IFRS adoption across the EU. Higher Pr firms in the UK are, therefore, associated with higher economic benefits from this regulatory decision relative to their lower Pr counterparts. The elimination of self-selection bias in the

²¹ As a further test of the robustness we also include changes in foreign sales to total sales between pre- and post-decision period as a control variable. This does not change the results. The *t*-statistics on the Pr coefficients are 3.12 and -2.41 when estimating the cost of capital according to the abnormal earnings growth and PEG models respectively. It is left out of the tabulated results as there is no theoretical or empirical evidence for a connection between foreign sales and the cost of capital.

mandatory setting we study could account for this difference with previous studies of voluntary accounting-policy-choice setting. Finally, in both panels A and B of Table 7, the *Pr* values based on Model 2 exhibit an insignificant relationship with long-run changes in implied cost of equity. This is consistent with our interpretation of Table 4 that the addition of industry dummies only adds noise to the analyses of the UK sample. It also strengthens the argument that industry effects may be more important in capturing the first-mover advantage in Germany than in the UK, perhaps because it is correlated with corporate governance structure that is more important in explaining IFRS adoption choice in Germany than the UK.

5.5. Robustness tests of long-run changes in cost of equity

To enhance the robustness of our findings in Table 7 we conduct additional robustness tests on the relationship between our counter-factual proxy for the willingness to adopt and the long-run changes in the cost of equity. First, we include industry dummies in our tests to control for possible correlation with industry membership. Second, we control for other disclosures than those presented in the annual and interim reports. If our results are robust we should find the strongest relationship among firms with the least other disclosures, as IFRS adoption is only related to the annual and interim reports. Third, we test whether the relationship is less pronounced among ADR firms that already indirectly comply with an international accounting regime. Finally, we test if this relationship only exists around the decision period (1999 and 2000) by reperforming the test just before this period.

5.5.1. Controlling for industry effects

Although we control for changes in factors generally known to be correlated with risk, it remains uncertain whether our regression model sufficiently controls for cross-sectional differences in firm characteristics. Many firm characteristics are correlated with industry membership and thus controlling for industry fixed effects enables us to test whether the relationship is independent of these. Table 8 panel A includes 25 industry dummies based on the major industry classification in *Worldscope* (the coefficients on industry dummies are not reported). The results show that the relationship is slightly stronger after controlling for the industry effect. Thus, the lack of control for industry effects is not responsible for the relationship between the implied cost of equity and the counter-factual proxy for willingness to adopt.

5.5.2. Disclosures unrelated to IFRS

IFRS is limited to disclosures in the annual and interim reports. Although these statements are among the most important a firm makes it is not the only way to communicate with the market. If other disclosures are substantial the annual and interim reports would become relatively less important. Therefore, the economic consequences of mandatory IFRS are expected to be less pronounced. Following Leuz (2003) and Lang and Lundholm (1996) we use analyst following as a proxy for the level of other disclosures. We partition the sample into two sub-samples, following Botosan (1997), and define low following as below the median of the sample (3.5 analysts) and high following as above the sample median. The number of analysts following the firm is defined as the average yearly following from 1998 to 2002 obtained from IBES.

Table 8
Robustness test of the association between the similarity to German voluntary IFRS adopters and the change to the implied cost of equity

	Intercept	Pt	Pt*ADR	ADR	ΔMV	ΔBM	ΔDTM	ΔSG	ΔOPM
Panel A: Including industry dummies									
Ohlson-Juettner model	0.12845 [3.58]	0.13398 [-3.59]			0.51721 [5.20]	0.02923 [1.42]	0.04082 [3.13]	0.00000 [0.05]	-0.00012 [1.50]
PI-G model	0.09178 [2.97]	0.09286 [-2.84]			0.55763 [6.01]	0.02952 [1.47]	0.03293 [2.79]	0.00003 [0.40]	0.00001 [0.19]
Panel B: High low analyst following									
<i>High analyst following ($t > 3.5$)</i>									
Ohlson-Juettner model	0.05008 [2.56]	0.05405 [-1.72]			0.70606 [4.29]	0.03000 [1.11]	0.01290 [1.24]	0.00025 [1.10]	0.00000 [-0.01]
PI-G model	0.04039 [2.38]	0.03242 [-1.18]			0.68270 [4.46]	0.03092 [1.26]	0.00835 [0.84]	0.00051 [2.79]	0.00027 [2.20]
<i>Low analyst following ($t < -3.5$)</i>									
Ohlson-Juettner model	0.08961 [2.97]	0.14093 [2.77]			0.42238 [3.59]	0.00871 [0.30]	0.53605 [2.22]	0.00005 [0.43]	0.00009 [0.92]
PI-G model	0.07295 [2.70]	0.07641 [-1.79]			0.47291 [4.30]	0.01539 [0.52]	0.04545 [2.09]	0.00002 [0.28]	0.00007 [0.94]
Panel C: Including ADR-listed firms									
Ohlson-Juettner model	0.07204 [3.65]	-0.09770 [-3.07]	0.14883 [2.23]	0.06532 [1.96]	0.51255 [5.14]	0.01409 [0.74]	0.03210 [3.06]	0.00000 [-0.09]	0.00009 [-1.33]

PEG model

Panel D: Alternative test period (PEG model)

Main test	0.06113 [3.44]	0.05840 [2.09]	0.08346 [1.33]	-0.03484 [1.09]	-0.54636 [-5.82]	-0.01438 [0.78]	0.02280 [2.45]	-0.00004 [-0.57]	0.00003 [0.42]
Including ADR-firms	0.01252 [1.28]	0.01993 [1.11]			-0.23026 [-4.96]	0.00337 [-0.39]	0.02816 [2.93]	0.00005 [0.26]	0.00214 [-2.06]
High analyst following (>3.5)	-0.01199 [-1.22]	0.01918 [1.07]	0.04130 [1.54]	0.01764 [1.28]	-0.23389 [-5.81]	0.00326 [-0.47]	0.02493 [3.32]	0.00006 [0.29]	0.00208 [-2.18]
Low analyst following (<3.5)	-0.01533 [-1.87]	0.02096 [1.38]			-0.18632 [-4.55]	-0.01060 [-1.11]	0.01940 [1.79]	0.00012 [0.91]	-0.00242 [-4.43]
	-0.00608 [0.14]	0.00475 [0.14]			-0.31891 [-2.86]	0.00119 [0.06]	0.04178 [2.73]	0.00012 [-0.26]	-0.00187 [-1.35]

This table presents the coefficient and *t*-statistics (in brackets) of cross-sectional regressions of changes in implied cost of equity capital on the degree of similarity to German voluntary adopters (Pr) controlled by changes in market capitalization (ΔMV), changes in book-to-market value (ΔBM), changes in debt-to-market value (ΔDTM), changes in sales growth (ΔSG), and changes in operating profit margin (ΔOPM). The implied cost of equity capital is calculated based on the Ohlson and Juettner-Nauroth (2003) abnormal earnings valuation model and the Easton (2004) PEG valuation model. The changes in implied cost of equity capital $\Delta(CF_{1,t})$ and $\Delta(CF_{1,t+1})$ are calculated as the difference in a 36-month median between the pre-announcement period (January 1996 to December 1998) and post-announcement period (October 2001 to September 2004). The Pr value is calculated based on Model 1 described in Table 3. The control variables are calculated as their difference in a three-year median value between pre-announcement and post-announcement periods. The *t*-statistics are adjusted for heteroskedasticity. Panel A further includes 25 industry dummies as classified by Worldscope's major industry classification. Panel B partitions the sample into a low analyst-following and high analyst-following group. High analyst following is defined as above the median of average yearly following from 1998–2002 and low following is the remaining firms. Panel C includes 43 firms cross-listed in the US. The cross-listed firms are assigned a dummy variable taking the value one if the firm is cross-listed in the US and zero otherwise (ADR). Pr*ADR is the interaction between Pr and ADR. Panel D presents the results of a regression of changes in the cost of capital on the Pr value and a set of control variables. The change in the cost of capital is calculated according to the PEG model as the difference between the 36-month median from January 1990 to December 1992 and the 36 months median from October 1995 to September 1998. The change in the control variables are calculated over the same period as the change in the cost of capital.

Table 8 panel B reports the findings. The absolute size of the coefficient on the counter-factual proxy for willingness to adopt is almost three times larger in the low analyst-following group than in the high analyst-following group using the Ohlson and Juettner-Nauroth (2005) abnormal earnings growth model to estimate the implied cost of equity, and twice as large using the Easton (2004) PEG model. In the low analyst-following group the relationship is significant at the 1% level (p -value 0.006), whereas it is only significant at the 10% level (p -value 0.087) in the high analyst-following group when estimating the implied cost of equity using the abnormal earnings growth model (the difference is significant at the 10% level). When the PEG model is used, the relationship is marginally significant (p -value 0.075) in the low analyst-following group and not significant (p -value 0.238) in the high following group (the difference is not significant at conventional levels). These results are consistent with the findings in Botosan (1997). The additional disclosure imposed by IFRS mainly benefits firms with low analyst following. The results are consistent with the relationship between long-run changes in the cost of capital and the counter-factual proxy for willingness to adopt being caused by changes to the annual and interim reports, which is associated with IFRS, and not with an omitted correlated variable.

5.5.3. Including a control group

Until now we have excluded cross-listed firms from the sample. The logic behind this approach is that firms that are cross-listed are under more scrutiny from foreign investors and analysts and therefore are not on a comparable basis with the rest of the UK sample. In the UK, the majority of cross-listed firms have ADR-listings in the US. These firms generally produce reconciliations of income and book value of equity to US-GAAP. That is to say, these firms are indirectly already complying with an international accounting regime. Leuz (2003) provides empirical evidence that the difference in economic consequences of voluntary adoption of IFRS or US-GAAP is statistically insignificant.

As a robustness check, we test if the connection between our counter-factual proxy and the change in the implied cost of capital is indeed less pronounced among ADR-listed firms. If the relationship is equally significant among the ADR-listed firms, which already disclose earnings and book value of equity under an international accounting regime, this could imply that the connection arises by chance or is driven by some unobserved correlated variable and not mandatory adoption of IFRS. On the other hand, the observation that this relationship only exists among firms that do not have an ADR listing would mitigate these concerns. We identified 43 firms that are ADR-listed in the US stock market, and meet all data requirements described in Section 4.6. The number of ADR-listed firms is too small to partition the sample based on this variable but large enough for us to add them to the main sample with a dummy variable (ADR) and an interaction term between ADR and the counter-factual proxy for willingness to adopt ($Pr \times ADR$). Table 8 panel C reports the results. The coefficient on $Pr \times ADR$ is positive both when estimating the implied cost of equity, using the abnormal-earnings growth and PEG models, but only significant in the former case. Regardless of estimation model, the relationship between the change in the cost of equity and the counter-factual proxy for ADR-listed firms (the coefficient on Pr and $Pr \times ADR$ together) is positive and insignificant (p -value 0.377 and 0.647, respectively). These results imply that the connection is not present in the ADR-listed control group and are consistent with the counter-factual proxy for willingness to adopt only explaining the change

in the implied cost of equity when the firm does not already comply with an international accounting regime.

5.5.4. Non-decision making period

If the relationship between our counter-factual proxy of the UK firms' willingness to adopt and long-run changes in cost of equity exist by default and is not specific to the decision period we examine, then we would wrongly infer the results in Table 7 as a support for H1B. To mitigate this concern, we measure the long-run changes in cost of equity around a non-decision-making period and replicate the tests in Section 5.4. We use the latest possible period before the decision period (1999 and 2000) and restrict our tests to PEG estimates of the cost of equity to limit the loss of observations due to data availability. The results presented in Table 8 panel D show that the coefficient on the *Pr* value, contrary to expectations, is positive but insignificant (*p*-value 0.27). Including ADR firms as a control group does not change this result and the interaction term between the ADR dummy and the *Pr* value is insignificant (*p*-value 0.13). Finally, the coefficient on the *Pr* value is higher in absolute terms for firms with a high analyst following (although insignificant), inconsistent with the relationship being driven by changes to the annual and interim reports. Thus, replication of the test just prior to the decision period does not suggest that the relationship between *Pr* and changes to the cost of capital exists by default.

5.5.5. The technology bubble

Our overall study period spans from 1996 to 2004 during which the technology bubble occurs. Since this phenomenon is likely to be sector-specific, the observations that our results for the short-run market-reaction analyses (Table 5 panel B) and for the long-run changes in cost of equity-capital analyses (Table 8 panel A) remain robust after controlling for industry effect indicate that they are not driven by the bubble. In addition, the long-run change in cost of equity capital is computed from the pre-announcement period (January 1996 to December 1998) to the post-announcement period (October 2001 to September 2004), which is likely to exclude the peak period of this bubble. Finally, we also applied ADR-listed firms as a control group in the robustness check for the analyses of long-run changes in cost of equity capital (Table 8 panel C). Since the ADR control group is also likely to be affected by the bubble, it is unlikely that our findings would be driven by this particular phenomenon.

5.6. Implications

The inferences from both methodologies used in this study are consistent with significant differences across the population of UK quoted firms in the perceived net benefit of mandatory IFRS adoption.

These results highlight another dimension of the implication of IFRS adoption not explored in existing literature, which suggest either a reduced cost of capital (Leuz & Verrecchia, 2000) or no effect (Daske, 2006; Cuijpers & Buijink, 2005). Contrary to these views, we conclude that IFRS adoption has resulted in winners and losers. Rather than portraying IFRS as a uniformly good thing or a uniformly bad thing, it is important to recognize that some firms gain and some firms lose from complex, mandatory-accounting changes such as IFRS. This seems to us to make sense, because if all UK firms would have

benefited from a regime like IFRS then it would have been adopted by the Accounting Standards Board (ASB) years ago.

Although our results do not imply that the cost of capital has been reduced or increased as a consequence of mandatory IFRS in general, the knowledge that significant differences exist among firms is important when considering costs and benefits to society. Implementing mandatory IFRS has the potential to redistribute wealth among agents in society through changes to the cost of capital. If the sole aim of the policy is to reduce the cost of capital, the best solution might be optional compliance as opposed to mandatory compliance. Optional compliance would allow firms to assess their own net benefits before committing to IFRS.

This paper also makes a methodological contribution by showing that the economic consequences of mandatory-accounting regulation in one economy may be partially predictable by using information contained in the accounting-policy commitments in a similar economy. This is a particularly interesting finding in the setting we use, because Germany and the UK differ in their approach to accounting regulation. Germany is generally classified as a code-law country and the UK is generally classified as a common-law country (Nobes, 2006). The fact that the same factors are significant determinants of benefits to international accounting harmonization suggests that benefits are driven by firm-specific characteristics rather than or maybe in combination with the quality of the national legal frameworks firms are departing from. Prior studies have focused on the quality of national regulation (Comprix et al., 2003). Future research in this area could examine how differences and links between country-specific and firm-specific factors affect the cost of capital changes caused by regulatory changes like mandatory IFRS adoption.

Finally, the finding that UK firms with a higher willingness to adopt the IFRS if given a chance are also those that would benefit from additional disclosure leads to several interesting questions. First, what is the disclosure quality of these firms? Are these firms that supply lower-quality information by choice or are these firms with increased demand for information due to growing investor interest? Second, if such firms knew that improvements in disclosure will benefit them, then what action did they take when voluntary adoption of IFRS was not allowed in the UK? To what extent are they allowed to voluntarily disclose more information under existing UK-GAAP? Could they have compensated with high-quality auditors? Finally, if UK-GAAP is assumed to be close to IFRS, then why should the decision of mandatory IFRS adoption incur economic consequences? Could our empirical evidence imply an overestimation of the degree of similarity between the two sets of standards? Alternatively, could any given differences between UK-GAAP and IFRS (although small relative to the difference between HGB and IFRS) have varying implications across UK firms? These questions are worthy of further study.²²

6. Summary

In Germany, firms have had the option to comply with an international accounting regime (IFRS or US-GAAP) instead of domestic standards since 1998 and voluntary adoption is widespread. In the UK firms have not had this option and compliance with an international

²² We thank Willem Buijink for suggesting them.

accounting regime is, therefore, very limited and only as a supplement to UK-GAAP. From 2005, IFRS is mandatory in both Germany and the UK as a consequence of EU regulation. We use this unique setting to create a counter-factual proxy for UK firms' willingness to adopt IFRS based on German firms' actual accounting-standard choices, and show that this proxy can predict cross-sectional variations in the economic consequences of mandatory IFRS adoption in the UK.

Using an event-study methodology, we find evidence that the stock-price reaction of UK firms to announcements favorable (unfavorable) to mandatory IFRS adoption is positively (negatively) related to our proxy for UK firms' willingness to adopt IFRS. To increase robustness we also study the long-run changes to the implied cost of equity of UK firms after the decision to mandate IFRS. We find that the change to the implied cost of equity is negatively related to our proxy for UK firms' willingness to adopt IFRS. Based on these two methodologies, we infer that cross-sectional variations in the economic consequences of mandatory IFRS adoption by UK firms can be predicted by their willingness to adopt IFRS proxied by the degree of similarity in characteristics with German voluntary IFRS and US-GAAP adopters.

Thus, mandatory IFRS has a different effect on the cost of capital depending on firm characteristics. Firms with similar characteristics to German voluntary adopters have greater benefits from international accounting harmonization and in particular from mandatory IFRS adoption.

This study also provides evidence on the information contained in firms' accounting policy commitments. We show that commitments made in one country can be used to predict the economic consequences of mandatory regulation in another country. Of course, some determinants may be less transferable from Germany to the UK, given the fact that the two countries investigated differ in their approach to accounting regulation, with the UK's common-law regulation being more similar to IFRS than Germany's code-law regulation. Thus, whereas the prior literature generally argues that relative reductions in cost of capital is related to the quality improvements in the legal framework, this study suggests that relative benefits are at least partly explained by firm-specific factors.

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Accounting information and the valuation of Seasoned Equity Offerings (SEOs)

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Abstract

This study investigates the association between publicly available information disclosed in the SEO prospectus and offer prices of SEOs, as well as the association between this type of publicly available information and stock returns subsequent to an SEO after controlling for self-selection bias. The empirical evidence shows that disclosure of the planned uses of the SEO proceeds reveals value-relevant information which has been incorporated by the underwriters in setting the offer prices. Control for self-selection bias appears necessary to obtain unbiased estimates in the regression model explaining the determinants of offer price in SEOs.

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Keywords: Seasoned equity offerings; Self-selection bias; SEO prospectus; Planned uses of proceeds

1. Introduction

A number of studies have attempted to explain stock returns subsequent to Seasoned Equity Offerings (SEOs) by using variables that rely on historical accounting information. Specifically, these studies use historical financial information as potential drivers of post-

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issue stock returns.^{1,2} Firms, however, operate in a complex environment where the investor's needs for information force firms to provide additional information with a forward-looking orientation. The prospectuses of SEOs, for firms listed on the Athens Stock Exchange, contain information about the planned uses of the SEO proceeds and the forecasted earnings.

The planned uses of the SEO proceeds provide information with a forward-looking orientation that has not been used to explain the post-issue stock return performance.³ The introduction of the planned uses of the proceeds as additional explanatory variables is important as it reveals to the stock market the future investments of the issuing firm.

Another important aspect that has been neglected in the case of SEOs is that the external-financing decision comprises a natural self-selecting event. A firm's intention to seek external financing, through a rights issue, could itself reveal information about the capital structure and/or financial performance of the firm. To control for this self-selection-bias phenomenon, the study includes Heckman's (1979) inverse Mills' ratio in the regression models examined. This methodology requires that the sample include not only firms that have issued equity but also firms that have not (i.e. *non-issuers*).

Cross-sectional regression models are used to investigate the association between the planned uses of the proceeds disclosed in the SEO prospectus. This includes the price at which the new shares are offered to the public and the stock returns subsequent to the seasoned equity offering event. The SEO prospectus discloses the intended uses of the proceeds, which are desegregated into four different categories: payment of pre-SEO debt, investments in working capital, investments in fixed assets, and investments in other companies. The study examines the following research questions: Do the underwriters efficiently price the SEOs by incorporating in the offer price all publicly available information, including information with a forward-looking orientation? If they do, then no association is expected between stock returns subsequent to the SEO event and the forward-looking information regarding the planned uses of the proceeds. In addition, is self-selection correction an important variable in explaining offer prices and stock returns?

¹ Loughran and Ritter (1995), Spiess and Afleck-Graves (1995), Yoon and Miller, 2002, have focused on examining the poor stock-price performance in the post-offering period. Loughran and Ritter (1995) and Spiess and Afleck-Graves (1995) find that issuers underperform their benchmark firms on average about 7% per year in a 5-year horizon. They attribute the underperformance to the information asymmetry between managers and investors that allows firms to issue overvalued securities. Other studies, Teoh et al. (1998), Rangan (1998), Shivakumar (2000), have examined the phenomenon of using an earnings management technique to inflate earnings prior to seasoned equity offering in order to succeed a positive price reaction at the equity issuance.

² Loughran and Ritter (1995) find the book-to-market ratio and the market value of equity, as a control for size, to be the most important determinants of post-issue returns during their sample period. Teoh et al. (1998) find a significant negative association between pre-issue discretionary accruals and two- and three-year post-issue stock returns. Also that firm size is only marginally significant in predicting future returns, while the book-to-market ratio is highly significant. Rangan (1998) finds that discretionary accruals over a one-year period around the offering are negatively associated with market-adjusted returns in the following year. This finding is robust to the inclusion of other explanatory variables such as firm size, book-to-market ratio, sales and capital expenditures growth. Shivakumar (2000) documents that abnormal accruals prior to the SEO do not predict future returns above and beyond the book-to-market ratio and the firm size.

³ Jeanneret (2005) examines the long-run performance of French SEOs by using the intended uses of the proceeds as a classificatory mechanism and not as explanatory variables.

The following are the major findings of this study: The planned uses of the proceeds, the forecast of earnings, and the book value of equity are value-relevant in explaining offer prices. These findings suggest that underwriters rely on the information disclosed in the prospectus about capital that has already been invested (i.e., the book value of equity in the year prior to the SEO), the future investments of the firm (i.e., the planned uses of the proceeds), and the forecasts of earnings to set offer prices. The insignificance of the intended uses of the proceeds to explain stock returns subsequent to SEOs is consistent with efficient pricing of this information by the underwriters. The control for self-selection bias is necessary to obtain unbiased estimates only in the regression model that explains offer prices.

The remainder of the paper is organized as follows: Section 2 describes the equity-offering process for Greek SEOs. Section 3 presents the research methodology developed to control for self-selection bias. Section 4 describes the sample and data sources. Section 5 discusses the empirical findings. Section 6 presents additional robustness checks and Section 7 summarizes the findings.

2. The SEO process

The standard method of increasing share capital for firms listed on the Athens Stock Exchange (ASE) is through an equity-rights issue. Greek legislation (P.D. 348/1985) requires that a firm deciding to proceed with a rights issue must call a general assembly of the shareholders. The announcement must appear in the press at least 20 days prior to the meeting. A majority of 2/3 of the voting stock is required for the general meeting to reach a decision to proceed with the offering. After the meeting of the stockholders, firm management informs the Ministry of Development and the Athens Stock Exchange of its decision to proceed with the rights issue and waits for their approval. The firm, in accordance with the requirements of the Commission on Capital Markets and the Athens Stock Exchange, must publish an SEO prospectus. The firm must have one or more underwriters, who guarantee the accuracy of information disclosed in the prospectus and are responsible for disseminating the prospectus to potential shareholders.⁴ New shareholders can subscribe to the capital increase by buying rights from the old stockholders. The ASE, through a press release, announces the trading date of the new shares, which is usually 15 days after the last trading date of the preference rights.⁵ In some cases, it is stated in the prospectus that the leading underwriter has the responsibility to take up the rights that are neither exercised nor sold.⁶ In the period that the share capital increase occurs, the preference rights are traded on the ASE and market forces determine their price.

⁴ Underwriters in the Greek stock market are either large banks (i.e., the National Bank of Greece, Emporiki Bank, EFG Eurobank, Alpha Bank) or major securities firms.

⁵ A special element of the rights issue is that the capital increase favors existing shareholders. The rights to purchase the new shares (preference rights) are sent to old shareholders in the form of a provisional-allotment letter.

⁶ This is optional. If the underwriter does not take up the rights that are neither exercised nor sold, the firm could either raise less money than expected or sell the shares not taken up to the public. These decisions are made up during the shareholders' general meeting when the capital increase is approved.

3. Methodology

Accounting literature contains a number of studies that have investigated the impact of self-selection bias in a variety of economic events (Abdel-khalik, 1990a,b). Abdel-khalik (1990a) investigated the significance of self-selection bias resulting from the endogenous partitioning of firms into good-and-bad-news portfolios and found that the correction for self-selection bias is an important determinant of security-price reaction at the announcement of historical accounting earnings. Abdel-khalik (1990b) also examined the cost to the auditor's client of self-selecting on acquiring management advisory services (MAS) from the incumbent auditor.

The notion that some firms decide on an SEO and others do not, introduces the issue of self-selection bias in the analysis. In response to the self-selection problem, the methodology proceeds by presenting the following two-equation model:

$$I^* = Z_i \gamma_i - \varepsilon_i \quad (1)$$

$$Y = X_i \beta_i + u_i \quad (2)$$

where:

- I^* is a latent variable representing the firm's preference either to make an equity offering ($I=1$) or not ($I=0$).
- Z_i is a vector of financial variables influencing this decision.
- Y is the economic outcome observed. In this study, Y represents the offer price and the post-issue stock returns.
- X_i is a vector of financial variables used to explain the offer price and the post-issue stock returns.
- γ_i, β_i are vectors of coefficients.
- ε_i, u_i are random error terms.

Eq. (1) specifies a probit regression that models the decision of a firm to conduct an SEO and determines the presence of self-selection. Eq. (2) models the association between publicly available information and offer prices or post-issue stock returns. The presence of self-selection bias causes the error terms ε_i and u_i to be correlated. This could cause standard OLS estimation procedure on Eq. (2) to yield inefficient and inconsistent estimates. To estimate the parameters consistently, the estimation method adopted is the two-stage estimation technique developed by Heckman (1976, 1979).⁷

The probit model (Eq. (1)) is used to estimate the probability that a firm will make a seasoned equity offering is a sequential-decision model with partial observability, as described in Maddala (1983). In this model, management first decides whether the firm is in

need of new capital and then chooses the way to raise the capital needed (equity vs. debt), which is described as follows.^b

$$\text{prob}(\text{issue}) = \text{prob}(\text{external financing}) * \text{prob}(\text{issue} | \text{external financing}) \quad (4)$$

$$\Phi(\mathbf{z}_1 \gamma_1) * \Phi(\mathbf{z}_2 \gamma_2)$$

where:

- \mathbf{z}_1 is a vector of variables that predict external financing.
- \mathbf{z}_2 is a vector of variables that predict preference of issuing equity vs. debt given the need for external financing.
- γ_1, γ_2 are vectors of parameters.

3.1 Variables predicting external financing

The vector (\mathbf{z}_1) of the variables that are used to estimate the probability that a firm will seek external financing are:

- The PAYOUT RATIO. The lower the ability of a firm to pay dividends, the higher the probability it will seek external financing (see, for example, Martin and Scott, 1974; and Marsh, 1982 for the use of the payout ratio as a predictor of the decision to issue equity).
- The Financial Slack (FS). Firms with higher financial slack are less likely to issue equity (Bayless & Diltz, 1991; Ooi, 2000).
- Prior SEOs. Firms that had SEOs in the recent past are less likely to need additional external financing.

3.2 Variables predicting equity issue over debt

Given that the firm is in need of new capital, the following vector (\mathbf{z}_2) of variables is used to examine whether the firm will issue equity or debt:

- STD IND. Standard deviation of ASE general index 252 trading days preceding the issue. Firms are less likely to issue equity when the market is more volatile (see, Choe, Masulis, & Nanda, 1993).
- SR. The cumulative stock returns 252 trading days preceding the issue. Firms with large positive returns in the recent past are more likely to issue equity (see, Guo & Mech 2000; Loughran & Ritter, 1995; Lucas & McDonald, 1990; Marsh, 1982 who have shown that firms with large positive abnormal returns are more likely to issue equity).
- AGE. The number of years between the IPO date and the issue announcement date. The more years a firm is listed on the stock market, the higher the likelihood to issue additional capital.
- MV/BV. The market-to-book value of equity ratio. The higher the market-to-book ratio the lower the probability of equity issue. The market-to-book ratio is used as a proxy for

^b In this model we observe a single indicator variable $I = I_1 * I_2$ and not I_1 and I_2 individually. The binary variable I is set equal to one if the company conducts an SEO and zero otherwise.

the level of information asymmetry. Myers and Majluf (1984); Jung, Kim, and Stulz (1996) suggests that information asymmetry is higher for firms with higher market-to-book ratios.

- DEBT. Firms with high leverage are more likely to issue equity (see, Jung et al., 1996; Marsh, 1982; McLaughlin et al., 1996).

4. Sample selection

The sample of the study consists of 237 SEOs that occurred during the period 1992 to 1999.⁹ Sample firms have not been involved in an IPO or SEO the year prior to the offering and have not conducted multiple SEOs in the same year. Further, firms are included in the sample if the following items are available: a prospectus, financial statements for the year prior to the offering, stock prices for at least 252 trading days preceding the SEO and 504 days following the SEO.¹⁰ The implementation of these selection criteria yields a sample of 129 firms issuing shares in SEOs.¹¹

To develop the partial observability probit model, as described in the methodology section, a second sample of non-issuing firms is required. A *non-SEO firm* is a firm that has not been involved in an IPO or SEO in the year prior to and the two years after the event date. The event date is randomly selected (*pseudo-issuing date*) from the available population of security trading days over the period 1992–1999.¹² The non-issuing firm must have available financial statements for the previous year and stock prices for at least 252 trading days prior to the non-issuing day. Each non-issuing observation is chosen only once in each year. Firms having negative book values of equity are excluded from the sample.¹³ These selection criteria yield a non-issuing sample of 518 non-issuing observations.¹⁴

The fiscal year in which the SEO occurs is year t ; thus fiscal year $t - 1$ is the year prior to the SEO and fiscal years $t + 1$ and $t + 2$ are the one and two years subsequent to the SEO. The historical accounting information is derived from published financial statements at the end of fiscal year $t - 1$. Information with forward orientation about the planned uses of SEO proceeds (i.e., information about investments in fixed assets, investments in other companies, debt repayment, and investments in working capital) comes from the SEO prospectus. Forecasted earnings for year t (the year for which the forecast pertains) are also retrieved from the SEO prospectus. The information used in this study is hand collected from prospectuses and publicly available financial statements. Stock prices are retrieved from the ASE database.

⁹ Banks, insurance, lease and investment companies have been excluded from the sample.

¹⁰ The methodology of this study requires available stock returns for four years surrounding the offering. This expands the years included in the study from 1990 to 2001.

¹¹ From the initial sample of 237 SEOs that occurred during the sample period, 36 did not have available financial information, 34 had an IPO or an SEO in the year preceding the issue, 7 had a negative book value of equity, and 31 did not have available stock prices.

¹² During the 1992–1999 period the total number of security trading days in the population is 322,308. From these days, pseudo issuing dates were randomly selected.

¹³ Three observations were deleted for having negative book value of equity.

¹⁴ *Non-SEO* firms have not conducted an equity offering in the three consecutive years surrounding a pseudo-issuing date. The number of issuing vs. non-issuing firms is based on information from the general population of the ASE firms. Jeanneret (2005) also classifies as non-issuers firms that have not undertaken an equity issue within the last 36 months.

Table 1
Frequency of SEOs over the study period

Year	Listed companies ^a	SEOs	Non-SEOs
1992	98	3	16
1993	104	14	30
1994	145	17	44
1995	161	6	34
1996	180	7	39
1997	182	12	90
1998	196	17	123
1999	217	53	142
Total		129	518

^a The number of listed companies on the ASE, excluding banks, insurance, lease and investment companies, during the sample period, 1992–1999.

Stock returns SR_{it} and market returns, MR_{it} are measured for 24 months (504 trading days) subsequent to the SEO. Appropriate adjustments for stock splits and stock dividends are also considered. Table 1 shows the frequency of equity issuing and non-issuing firms over the time period of the study. Most SEOs occur in the years 1993, 1994, and 1999.¹⁵

Table 2 panel A provides descriptive statistics for the 129 issuing and 518 non-issuing firms included in the probit model. Table 2 shows that issuing firms have substantially higher price run-ups prior to the event (1.50% vs. 1.06%) than non-issuing firms and lower debt-to-total assets ratios (27.7% vs. 21.5%). Also, they differ in terms of financial slack (9.10% vs. 7.03%). The univariate test also shows that the market conditions (standard deviation of the index) prevailing for the issuing firms are different than those for the non-issuing firms. The correlations presented in Table 2 panel B between the variables included in the probit model are relatively low. The correlation matrix of the variables used in the regression models is presented in Table 2 panel C. These correlations are also not especially high.

Table 2 panel D presents the univariate statistics for the variables on the designation of the SEO proceeds. The mean (median) value of gross proceeds derived from the SEOs is 58,990 (15,050) thousands of euros, while the mean (median) value of the issuing offer price is 4.82 (3.82) euros. As measured by the market value of equity at offer prices, the means (medians) of firm size are 110,529 (38,937) thousands of euros. Observing the statistics for the planned uses of the proceeds variables we notice that investment in fixed assets ($invFA_t$) has the highest mean, median, and interquartile ranges. The amount of capital designated for investments in other companies ($invOTHER_t$) is higher than the amounts designated for working capital needs ($invWC_t$) and for payment of pre-SEO debt ($PofD_t$).¹⁶ The mean earnings forecast error, -24.48%, is significantly less than zero at the 5% level of significance. The minus sign of the earnings forecasts error indicates that, on

Cumulative market returns (CMR) over the sample period reveal that the years 1993, 1998, and 1999 could be characterized as years of euphoria for the ASE, while the years 1992 and 1994 were bad years (CMR of 38.93%, 68.76%, 70.87%, -14.62%, and -10.61%, respectively)

The distributions of the variables regarding the use of the proceeds are highly skewed to the left, indicating that there are some firms in the sample that raise high amounts from the equity issue.

average, earnings forecasts are over-estimated. This means that SEOs firms forecast higher earnings for the equity offering year than they actually report.

5. Empirical findings

5.1. The probit model

The objective of the study is to examine whether information disclosed in the SEO prospectus explains offer prices and stock returns subsequent to the equity offering after controlling for self-selection bias. This requires the estimation of the inverse Mill's ratio through probit analysis specifying the probability of a firm to make an equity offering.¹⁷

Table 3 reports the outcome of the probit estimation. The financial slack variable (FS) is negative and statistically significant, indicating that firms with higher amounts of cash and cash equivalents are less likely to need additional financing. The significant explanatory variable (SR) is consistent with prior research (Bae, Jeong, Sun, & Tang, 2002; Guo & Mech, 2000; Jeanneret, 2005; Loughran & Ritter, 1995; Lucas & McDonald, 1990; Marsh, 1982), which has shown that firms tend to issue shares after large price run-ups in the time period preceding the issue. Moreover, the coefficient of the variable debt (DEBT) is positive and statistically significant.¹⁸ This finding is in line with prior research, which has shown that firms with high leverage are more likely to issue equity. The remaining variables are not significant.¹⁹ The percentage of correctly classified firms is 67.39%.²⁰

5.2. Determinants of the offer price

This section examines the association between the offer price of the new shares issued and the planned uses of the SEO proceeds disclosed in the prospectus. The model investigates whether the uses of the proceeds provide value-relevant information and whether the underwriters use this information in setting the offer price.²¹ If the planned uses of the SEO proceeds to finance specific investment projects provide information about the value of the firm and underwriters take into account this information while setting the offer prices, then the uses of these proceeds should be significantly associated with the offer price of the new shares issued.

The following regression is estimated:

$$\text{Offer price} = a_1 \text{PofD}_t + a_2 \text{invWC}_t + a_3 \text{invFA}_t + a_4 \text{invOTHER}_t + a_5 \text{FE}_t + a_6 \text{BV}_{t-1} + a_7 \lambda + \varepsilon \quad (5)$$

¹⁷ The program that has been used to compute the inverse Mill's ratio is LIMDEP.

¹⁸ A measure of risk, which was used instead of debt, was the standard deviation of market-adjusted returns 126 trading days (approximately six 6 months) preceding the issue-announcement date and the results remained in the same direction.

¹⁹ Other accounting variables have also been used to estimate the probability of an SEO (i.e., the growth in earnings for three years prior to the SEO and total assets as a proxy for size). The inclusion of those variables did not change the findings of the model.

²⁰ See Maddala, G.S. (2000) for the explanation of the Count R^2 measure.

²¹ Investors are not fully aware about the items of information that the underwriters, in conjunction with company's management, utilize in setting the offer price of the new shares issued.

Table 1
Panel A: Descriptive statistics for the sample and non-sample firms included in the probit model

	Non-sample sample N = 15		Sample sample N = 199		(t test) differences in the means
	Mean	Median	Mean	Median	
PSLO	0.503	0	3.286	0	1.13500
PAYOUTRATIO	183.1	1410	4336	4431	0.647
LS	0.008	0.355	0.703	0.570	0.274**
AGJ	16.0189	6.6780	14.3578	18.667	0.296
MIN BV	1.356	6.79	1.3112	76.28	0.040
DBIT	2.768	5.32	2.18	2.11	0.157***
SR	1.0621	0.981	1.808	7.583	1.105
STDIND	0.168	0.169	0.098	0.214	0.5609***

Panel B: Spearman correlations of the independent variables of the probit model

	PSLO	PAYOUTRATIO	LS	AGJ	MIN BV	DBIT	SR	STDIND
PSLO	1.000							
PAYOUTRATIO	0.5	1.000						
LS	0.11	0.46***	1.000					
AGJ	-0.05***	0.71***	0.34***	1.000				
MIN BV	-0.31	0.06	0.93**	0.70	1.000			
DBIT	-0.03	0.07**	0.61***	0.87	0.88**	1.000		
SR	0.95**	0.01	0.58	0.29	1.51***	-0.348***	1.000	
STDIND	0.10***	0.16	0.58***	0.38	0.77***	-0.243***	0.29***	1.000

Panel C: Spearman correlations of the variables of models (5) and (6)

	OTTRPRCT	PotD	mWC	mVLA	mVOTHR	LL	BV	ρ	MIR _{it}	SR _{it}
OTTRPRCT	1.000									
PotD	0.79	1.000								
mWC	0.58**	0.64	1.000							
mVLA	0.34***	0.97	0.49	1.000						
mVOTHR	0.47**	0.92	0.95	0.95	1.000					
LL	0.65***	0.87**	0.78**	0.78**	0.81**	1.000				
BV	0.468***	0.74	0.71	0.31	0.79	0.541***	1.000			
ρ	0.31*	0.71	0.13	0.31	0.31	0.285***	0.34	1.000		
MIR _{it}	0.28	0.99	0.90	0.90	0.38	0.190**	0.275***	0.012	1.000	
SR _{it}	0.11	0.94	0.91	0.91	0.75	0.128	0.243***	0.080*	0.850***	1.000

Panel D Descriptive statistics on the use of proceeds.

Variables	Mean	Std. dev.	Median	Std. dev.
mktA	0.885***	0.083	10.88	284
mktOHHR	0.138***	0	0.296	287
mktWC	0.060***	0	0.20	1381
PoolD	0.019***	0	0	1220
Gross proceeds	58,980,96***	4,399,685	18,649,74	46,380.8
Net after tax proceeds	110,839***	6,030.61	38,936.61	58,0289.8
Off to bank	4,818,3***	964.5	88181	188,885.4
Present value	3448***	3.60	6487	43947

Definition of the variables: for panel A and panel B

PSJO dummies variables taking the value one if the firm made an SJO in the year $t-1$ and $t-2$ and zero otherwise.

PAYOFF (RATIO) annual dividend, $(t-1)$ not paid $(t-1)$.

15 cash and cash equivalents, $(t-1)$ total assets, $(t-1)$.

Net is the number of cash between the same time in one fiscal date and the IPO date.

Net WC market value of equity, $(t-1)$ book value of equity, $(t-1)$ market value of equity, t computed as the sum of total debt, net cash t .

PoolD not in the trading day for the year $t-1$.

LOBL not in the long term debt, $(t-1)$ total assets, $(t-1)$.

SJO the cumulative total return to trading day preceding the same

SJO (ratio) standard deviation of SJO annual index to trading day preceding the same

LOBlessed the variable for panel C and panel D

Other price the other price of the new domestic and

PoolD paid amount for number of debt, t

mktWC the amount of working capital number of Euro, t

mktWC market interest rate number of Euro, t

mktOHHR market interest rate number of Euro, t

FF four factor model number of Euro, t

FF four factor model number of Euro, t

FF four factor model number of Euro, t

FF four factor model number of Euro, t

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Table 3

Results of the partial observability probit model

$\text{prob}(\text{issue}) = \text{prob}(\text{external financing}) * \text{prob}(\text{issue} \text{external financing}) = \Phi(z_1\gamma_1) * \Phi(z_2\gamma_2)$		
Variables	Coefficients	t-Statistic
Variables predicting external financing		
Constant	-0.202	(-1.16)
PSEO	0.419	(1.23)
PAYOUT RATIO	-0.093	(-0.72)
FS	-1.462	(1.64)*
Variables predicting issuance of equity over debt		
Constant	-0.426	(-0.90)
AGE	-0.005	(-0.87)
MV/BV	-0.022	(-0.38)
DEBT	1.371	(2.27)**
SR	0.801	(2.64)**
STD IND	31.135	(1.16)
Count $R^2 = 67.39\%$		

Definitions of the variables:

PSEO: dummy variable taking the value one if the firm made an SEO in the years $t-2$ and $t-3$ and zero otherwisePAYOUT RATIO: Annual dividends ($t-1$)/net profit ($t-1$).FS: (cash and cash equivalents ($t-1$)/total assets ($t-1$).

AGE: is the number of years between the issue announcement date and the IPO date.

MV/BV: market value of equity ($t-1$)/book value of equity ($t-1$). The market value of equity is computed as the number of total shares in year $t-1$ (the year prior to the SEO) multiplied by the price of the last trading day for the year $t-1$.DEBT: short term and long-term debt ($t-1$)/total assets ($t-1$).

SR: the cumulated stock return 252 trading days preceding the issue.

STD IND: standard deviation of ASE general index 252 trading days preceding the issue.

*Significant at 10% level (2-tailed test).

**Significant at 5% level (2-tailed test).

Where:

- PotD_t : company's SEO proceeds designated for debt repayment divided by the number of shares outstanding in year t .
- invWC_t : company's SEO proceeds designated for working capital needs divided by the number of shares outstanding in year t .
- invFA_t : company's SEO proceeds designated for investments in fixed assets divided by the number of shares outstanding in year t .
- invOTHER_t : company's SEO proceeds designated for investments in other companies divided by the number of shares outstanding in year t .
- FE_t : forecasted earnings divided by the number of shares outstanding in year t .
- BV_{t-1} : the book value of equity in year $t-1$ divided by the number of shares outstanding in year $t-1$.
- λ : inverse Mill's ratio.

Forecasted earnings and book value of equity in $t-1$ have also been used as explanatory variables by Ghicas, Iriouts, Papadaki, and Walker (2000) in explaining the offer price of

Greek IPOs.²² Proceeds designated for investments in fixed assets, working capital, investments in other companies, and repayment of pre-SEO debt are expected to be positively associated with the firm's offer price, i.e., these investments are undertaken because there are expected to be positive net present-value projects for the issuing firm and increase firm value. The four uses of the proceeds variables provide different information. Proceeds designated for the payment of pre-SEO debt and investments in working capital imply short term-needs, while proceeds designated for investments in fixed assets and in other companies imply long-term growth opportunities.²³ Selectivity bias is controlled by introducing the Mill's ratio ($\hat{\lambda}$) in model (5).

Table 4 presents the empirical findings from the estimation of the regression model (5). The reported *t*-statistics for this model as well as for all the other models of this study have been estimated using White's (1980) heteroskedasticity-consistent covariance matrix.²⁴ The planned uses of the proceeds for investments in fixed assets (invFA_t), suggesting the presence of long-term growth opportunities, and payment of pre-SEO debt (PofD_t) are positively associated with the offer price of the new shares and considered value-relevant information in setting offer prices. The insignificance of investments in working capital (invWC_t) and investments in other companies (invOTHER_t) suggests that these investments are zero net present-value projects. Forecasted earnings and book values of equity are also positively associated with the offer price.²⁵ These findings suggest that book values of equity and the forecasts of earnings contain value-relevant information that explains offer prices in SEOs. The overall findings indicate that underwriters rely on the information disclosed in the prospectus about capital that has already been invested (i.e., the book value of equity in $t-1$) as well in the future investments of the firm (i.e., the planned uses of the proceeds) and forecasts of earnings to set offer prices.

The positive and statistically significant coefficient of the selectivity variable ($\hat{\lambda}$) indicates that omitted variables having an impact on the choice of an equity offering are positively correlated with the offer price of the issuing firm. Moreover, the estimated coefficients and *t*-statistics in this model would be biased if self-selection was not controlled.

5.3 Post-issue stock returns

The study tests the efficient pricing of the information disclosed in the prospectus about the intended uses of the SEO proceeds. This test is based on the following regression model:

$$\text{SR}_{it} = \beta_1 \text{PofD}_t + \beta_2 \text{invWC}_t + \beta_3 \text{invFA}_t + \beta_4 \text{invOTHER}_t + \beta_5 \text{FE}_t + \beta_6 \text{BV}_{t-1} + \beta_7 \text{MR}_{it} + \beta_8 \hat{\lambda} + \varepsilon \quad (6)$$

²² Regulation of the Athens Stock Exchange (P.D. 348/1985) requires that earnings forecasts appearing in the SEO prospectus must be formed based on assumptions provided by firm's management and approved by the underwriter. The underwriter guarantees the accuracy of the prospectus in the sense that information contained is not "misleading" and is based on reasonable assumptions. Investors retain the legal right to request explanations and financial compensation from the firm or the underwriting institution if they have been misled by information disclosed in the prospectus.

²³ Four (4) firms have designated the funds raised in only one usage. Three firms (3) have invested the SEO proceeds in fixed assets and one (1) in re-payment of pre-SEO debt.

²⁴ Two outlying observations have been detected and removed by using the Cook's *D* measure proposed by Belshev et al. (1980). The Cook's *D* measure for these two observations was higher than one.

²⁵ This finding is consistent with the finding of Ghicas et al. (2000) where earnings forecasts disclosed in prospectuses are significant determinants of IPO offer prices in the Athens Stock Exchange.

Table 4
Determinants of offer price

Offer price = $a_1\text{PofD}_t + a_2\text{invWC}_t + a_3\text{invFA}_t + a_4\text{invOTHER}_t + a_5\text{FE}_t + a_6\text{BV}_{t-1} + a_7\lambda + \varepsilon$		
Variables	Coefficients	t-Statistic
PofD_t	2.496	(1.85)*
invWC_t	-0.887	(-0.70)
invFA_t	1.648	(1.84)*
invOTHER_t	1.036	(1.42)
FE_t	3.362	(3.54)***
BV_{t-1}	0.718	(2.73)***
λ	1.465	(3.60)***
Adj R^2 = 84.25%		
F-statistic = 75.10***		

Definitions of the variables:

Offer price: the offer price of the new shares issued.

PofD_t : payment of debt/number of shares t .

invWC_t : investments in working capital/number of shares t .

invFA_t : investments in fixed assets/number of shares t .

invOTHER_t : Investments in other companies/number of shares t .

FE_t : forecasted earnings/number of shares t .

BV_{t-1} : book value of equity/number of shares $t-1$.

λ : Mill's ratio.

*Significant at 10% level (2-tailed test).

***Significant at 1% level (2-tailed test).

Where:

- SR_{it} : Stock returns for 504 post-issue trading days.
- MR_{it} : The return on the ASE market index for 504 post-issue trading days.
- All the other variables are defined in model (5).

Table 5
The regression model

$\text{SR}_{it} = \beta_1\text{PofD}_t + \beta_2\text{invWC}_t + \beta_3\text{invFA}_t + \beta_4\text{invOTHER}_t + \beta_5\text{FE}_t + \beta_6\text{BV}_{t-1} + \beta_7\text{MR}_{it} + \beta_8\lambda + \varepsilon$								
β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	Adj R^2
1.072	1.323	0.665	0.014	0.197	0.402	3.819	0.560	0.52
(-1.26)	(-0.91)	(0.55)	(0.04)	(0.23)	(-0.24)	(2.22)**	(0.84)	7.20***

Definitions of the variables:

SR_{it} : stock returns for 504 post-issue trading days.

PofD_t : payment of debt/number of shares t .

invWC_t : investments in working capital/number of shares t .

invFA_t : investments in fixed assets/number of shares t .

invOTHER_t : investments in other companies/number of shares t .

FE_t : forecasted earnings/number of shares t .

BV_{t-1} : book value of equity/number of shares $t-1$.

MR_{it} : The return on the ASE market index for 504 post-issue trading days.

λ : Mill's ratio

**Significant at 5% level (2-tailed test)

***Significant at 1% level (2-tailed test).

Table 5 reports the empirical findings from the estimation of model (6).^{26, 27} The findings do not reveal a significant association between forward-looking information and future stock returns. This finding suggests that the underwriters have efficiently priced the SEOs by incorporating the information on a firm's intended uses of the proceeds in setting offer prices. The return of the market (MR_{it}) is the only significant variable that explains stock returns subsequent to SEOs.

6. Additional robustness checks

The following two sensitivity tests are performed to examine the robustness of the findings regarding the uses of SEO proceeds. First, models (5) and (6) have been estimated by substituting the multiple uses of the proceeds variables with a single use of funds variable. This new variable takes the value of the "largest" use of funds for each sample firm. Untabulated empirical findings show the robustness of the reported findings in Tables 4 and 5.

Second, to mitigate concerns that some other unobservable variables drive the results, models (5) and (6) have been estimated by including the book-to-market ratio, the natural logarithm of the market value of equity and the earnings-to-price ratio as additional explanatory variables. These variables have been suggested by Fama and French (1992). The introduction of the additional explanatory variables did not alter the findings reported in Tables 4 and 5, while the book-to-market ratio, used as a surrogate for growth, was not significant.

7. Conclusions

This study investigates the relation between publicly available information disclosed in the SEO prospectus and offer prices or post-issue stock returns after controlling for self-selection bias.²⁸ Information with a forward-looking orientation has not been used to explain the market valuation of SEOs. The findings illustrate that underwriters rely on the prospectus information and they incorporate this information in setting offer prices. Omitted variables, which have an impact on the choice of an equity offering, indicate the presence of selection bias in determining the offer price of SEOs. This finding suggests that self-selection bias affects inferences and that future research should control for this bias. Moreover, the insignificance of the intended uses of the proceeds to explain stock returns subsequent to an SEO is consistent with efficient pricing of this information by the underwriters.

²⁶ The estimated condition number implies the absence of multicollinearity among the independent variables in model (6).

²⁷ The model in Table 5 has been developed by including year dummies. The findings for these dummies have not been tabulated.

²⁸ The exclusion of Mill's ratio from regression models (5) and (6) will lead to the estimation of biased and inconsistent regression coefficients. Nevertheless, the exclusion of the Mill's ratio does not affect the inferences drawn from these models.

Appendix A

The methodology to address the self-selection problem is based on the following two-equation model:

$$I^* = Z_i \gamma_i - \varepsilon_i \quad (1)$$

$$Y = X_i \beta_i + u_i \quad (2)$$

where: Heckman (1976) and Maddala (1983) suggest that the conditional mean of the error term u_i must be estimated as follows:

$$E(u_i | \text{sample selection}) = E(u_i / I > 0)$$

$$E(u_i | \varepsilon_i < z_i \gamma_i) = \sigma_i \left[\frac{\phi(z_i \gamma_i)}{\Phi(z_i \gamma_i)} \right]$$

where: $\phi(\cdot)$ and $\Phi(\cdot)$ are the density and the distribution functions of a standard normal distribution.

The term $\frac{\phi(z_i \gamma_i)}{\Phi(z_i \gamma_i)}$ is known as the inverse Mill's ratio and can be obtained from the probit model (Eq. (1)). Including the inverse Mill's ratio in Eq. (2) corrects for self-selection and yields consistent parameter estimates in OLS. As a result, Eq. (2) can be rewritten as follows:

$$Y = X_i \beta_i + \sigma_i \left[- \frac{\phi(z_i \gamma_i)}{\Phi(z_i \gamma_i)} \right] + u_i \quad (3)$$

The heteroskedasticity problem of the error term in Eq. (3) is corrected by using White's (1980) heteroskedasticity-consistent covariance matrix. The models that are estimated based on Eq. (3) are the ones that explain offer prices and stock returns and are presented in Section 5 in the text.

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A productivity growth accounting approach to the ranking of developing and developed nations [☆]

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Abstract

Productivity growth accounting studies generally focus on productivity growth or decline in more developed countries such as the Organization of Economic Cooperation and Development (OECD) members. In this paper, we develop a generalized efficiency index for a much larger set of 57 national governments (NGs), both developing and developed, by employing four components of gross national product and five resource-availability indicators. Using a Data Envelopment Analysis (DEA) linear-programming approach, we maximize the components of Gross National Product (GNP), subject to minimizing specific resource-input measures. If used with appropriate precautions, the DEA-based comparative production-efficiency measures developed here can be used by individual NGs and international organizations like the World Bank and the International Monetary Fund to make equitable and sustainable lending-allocation decisions in the public and private sectors of the increasingly interdependent global economy.

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Keywords: Productivity growth accounting; Data Envelopment Analysis (DEA); Sustainable global development

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1. Introduction

Productivity literature has generally focused on growth or slowdown in the developed OECD (Organizations of Economic Cooperation and Development) countries during the seventies and eighties (Costello, 1993; Fare, Grosskopf, Norris, & Shang, 1994; Wolff, 1996). Although there has been a growing interest in productivity growth (decline) in highly developed nations, we have not seen a similar focus applied to a broader range of developing countries across the new world economies. The productivity winners and losers in the new global-information economies need to be identified and analyzed, both at the aggregate and individual country level. This is relevant since productivity rankings provide important inputs for sustainable and equitable resource-allocation decisions by national governments (NGs hereafter), as well as by international organizations like the World Bank and International Monetary Fund. Presumably, financial markets around the globe impound the GNP-and-GDP related aggregates, which are crude measures of productivity, in the pricing of foreign (national) currencies and debts issued by national governments. Decision makers may also use subjective rank ordering of productivity, as reflected in the various testimonies of the Federal Reserve Board Chairman before Congress.¹ The importance of the rank ordering made by NGs, in terms of sustainable productivity, has been recognized, [though not technically possible in classics such as Adam Smith's *The Wealth of Nations*, (1776; reprinted 1953, pp. 3–4.)]

Nations tolerably well advanced as to skill, dexterity and judgment in the application of labour, have followed very different plans in the general conduct or direction of it; those plans have not all been equally favourable to the greatness of its produce. The policy of some nations has given extraordinary encouragement to the industry of the country;...

In this paper we develop a more generalized linear-programming approach to rank 57 NGs in terms of overall production efficiency. Unlike traditional aggregate productivity measurements such as those generated by Cobb–Douglas functions, we use linear programming to measure and rank relative technical efficiency. This approach can include a large number of countries, in various stages of development (sustainable or not), employing resources to produce the various components of GNP. Data Envelopment Analysis (DEA) ranks relative efficiency by evaluating the extent to which the NG of each country minimizes input components (to be efficiently allocated), and maximizes the output components that comprise the GNP. The NG in each country is assumed to choose particular weights or coefficients for inputs and outputs that allow the country to achieve its maximum efficiency ranking.² In the conventional productivity growth studies that employ regression weights a single transformation function for all NGs is implied, or else subjective fixed

Although there are frequent references to changes in productivity in Alan Greenspan's and Ben Bernanke's testimonies before Congress, it is unclear how productivity rankings are determined vis-à-vis other national governments (NGs). We believe that the approach elaborated in this paper could become an important tool in the hands of the Federal Reserve Board and other NG central banks throughout the globe.

² This is in the spirit of Adam Smith, cited above.

weights are utilized. In our DEA approach, differing sustainable growth strategies followed by different NGs are accommodated by different coefficient weights for each NG. From these more flexible transformation functions we can identify the sources of efficiency or inefficiency for every NG included in our analysis.

The rest of the paper is as follows. Section 2 describes the DEA National Governmental Model employed to rank 57 NGs' productivity efficiency. Section 3 describes the empirical model employed and the data set used in measuring NGs' production efficiency. Sections 4 presents the basic results of the additive model and sensitivity analysis, and section 5 compares the additive to the ratio model's results. Section 6 partitions the 57-NG frontier into separate high- and low-income frontiers and examines the differences between the two. Section 7 looks at possible institutional explanations for the observed relative-efficiency differences. Section 8 provides a conclusion and discusses the governance and sustainable global-development implications of production-efficiency rankings.

2. The DEA National Government (NG) Model

The DEA model can be used to evaluate relative technical efficiency by transforming a set of inputs or resources to produce a set of multiple outputs. As a linear-programming implementation of Farrell's (1957) notion of technical efficiency, DEA is a frontier approach to efficiency evaluation as implied by production or cost theory. In particular, an efficient frontier is constructed that is composed of the NGs that either have as little input as possible to produce a given level of output, or produce as much output as possible from a given level of input consumption. Those NGs meeting one of the above criteria comprise the efficient frontier and are technically efficient, while those NGs not on the efficient frontier are technically inefficient (enveloped by the efficient NGs).

The original DEA model (the CCR model of Charnes, Cooper, and Rhodes, 1978), also known as the ratio or constant returns to scale (CRS) model, has been joined by other DEA models (such as the BCC model of Banker, Charnes and Cooper, 1984). The additive model of Charnes, Cooper, Golany, Seiford, and Stutz (1985) and the BCC model are characterized by variable returns to scale (VRS), and both provide insights into NG productivity comparisons. Using the additive model and an accompanying sensitivity analysis to rank order the NGs from most robustly efficient to most robustly inefficient, we employ a two-step process: In the first step, the technical efficiency status (efficient or inefficient) for each NG is determined by solving a linear program for each country. This envelopment model serves only to categorize NGs as either efficient or inefficient. In the second step, two different linear programs are solved, one for the efficient NGs and another for the inefficient NGs. For a particular efficient NG, the linear program yields a measure of its efficiency robustness (or amount of adjustments between inputs and outputs necessary to change the efficient classification to almost inefficient). For a particular inefficient NG, the linear program yields a measure of its inefficiency robustness (or amount of adjustments between inputs and outputs necessary to change the inefficient classification to almost efficient). These robustness measures then comprise the index for the order in which the NGs were ranked. We describe these two steps in detail below.

In the additive DEA model, the observed input consumption and output production for a number of NGs are measured; they are referred to as an NG's component vector. All

component vectors for the NGs under scrutiny are combined to form the empirical production possibility set (PE):

$$PE = \left\{ (Y^T, X^T) = \sum_{i=1}^n \mu_i (Y_i^T, X_i^T); \sum_{i=1}^n \mu_i = 1, \mu_i \geq 0 \right\} \quad (1)$$

where i represents the general index of $i = 1, \dots, 57$ NGs and (Y_i^T, X_i^T) is the transposed vector of outputs and inputs, respectively, for NG $_i$.

To determine the technical efficiency status (efficient or inefficient) for a given NG, its component vector is compared to PE. If no component vector in PE, observed or hypothetical, can be found that strictly dominates the tested NG, then it is said to be technically efficient. Those NGs, for which a component vector can be found in PE that strictly dominates, are said to be technically inefficient. Fig. 1 provides a graphical depiction of a set of NGs for a single-input, single-output example. In Fig. 1, NGs #1, #2, and #3 would be technically efficient, while NGs #4, #5, #6, and #7 would be technically inefficient. Segments 12 and 23 comprise the efficient frontier.

Mathematically, the test for the technical efficiency status of NG $_i$ is achieved by solving the following linear program:

$$\begin{aligned} \min & (-e^T s^+ - e^T s^-) \\ \text{s.t.} & Y\lambda - s^+ = Y_i \\ & X\lambda + s^- = X_i \\ & e^T \lambda = 1 \\ & \lambda, s^+, s^- \geq 0 \end{aligned} \quad (2)$$

where Y and X represent the pre-scaled matrices of the outputs and inputs, respectively; and s^+ and s^- denote the slacks for production shortfalls and excess input use. As the additive model is not units invariant, Y and X were pre-scaled by the standard deviations of each component.

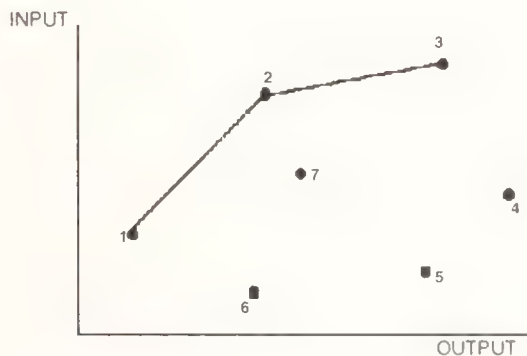


Fig. 1. Production possibility Set PE. Note: Efficient frontier comprised of segments 12 and 23

as suggested by Lovell and Pastor (1995). The e^T vector is the sum vector, guaranteeing a convex combination or scalar multiple (less than one) of the NGs under scrutiny.

Again, the execution of Eq. (2) for each NG serves only to categorize the NGs as technically efficient or inefficient. That is, the execution of Eq. (2) for each NG does not yield a set of measures which can be used to construct a rank order (efficient NGs all have efficiency scores of unity and cannot be ranked). To develop a rank order of most robustly efficient to most robustly inefficient NGs, one additional linear program must be executed for each NG, with the result yielding a infinity-norm measure of the minimum distance to a Pareto optimum point (efficient frontier). This sensitivity analysis establishes the robustness of the efficiency classification.

Charnes, Haag, Jaska, and Semple (1992), Charnes, Rousseau, and Semple (1996) and Seiford and Zhu (1998) developed a sensitivity analysis technique based on the infinity-norm measure of a vector. This technique defines the necessary simultaneous perturbations to the component vector of a given NG that cause it to move to a state of "virtual" efficiency. Virtual efficiency is defined as a point on the efficient frontier where any miniscule detrimental perturbation (increase in inputs and/or decrease in outputs) will cause an efficient NG to become inefficient, or any miniscule favorable perturbation (decrease in inputs and/or increase in outputs) will cause an inefficient NG to become efficient.

For an efficient NG, the infinity-norm measure, or the radius of stability (herein termed stability index), defines the largest "cell" in which all simultaneous detrimental perturbations to the input and output components will not cause a change in the efficiency status from technically efficient to inefficient. As such, the larger the stability index, the more robustly efficient the NG is said to be. Those efficient NGs with small stability indices will thus become technically inefficient, with smaller detrimental perturbations than those efficient NGs with larger stability indices.

Mathematically, the stability index for an efficient NG (NG_j) is determined by solving the following linear program:

$$\begin{aligned} \min \quad & \theta \\ \text{s.t.} \quad & Y^{(E)}\lambda - s^+ + \theta d_0 = Y_j \\ & X^{(E)}\lambda + s^- - \theta d_1 = X_j \\ & e^T\lambda = 1 \\ & \lambda, s^+, s^-, \theta \geq 0 \end{aligned} \quad (3)$$

where θ represents the stability index. The matrix of outputs and inputs are represented by $Y^{(E)}$ and $X^{(E)}$, respectively, with the component vector for efficient NG, omitted. Finally, d_0 and d_1 are given by d_0^T and $d_1^T = (1, 1, \dots, 1)$, which cause θ to simultaneously increase inputs and decrease outputs as the linear program determines the optimal solution. Fig. 2 provides a graphical depiction of the infinity-norm measure (stability cell) for efficient NG 2. Note that θ represents the lengths of the dotted lines within the stability cell.

For an inefficient NG, the stability index defines the largest "cell" in which all simultaneous favorable perturbations to the input and output components will not cause a change in the efficiency status from technically inefficient to technically efficient. As such, the larger the stability index for an inefficient NG the more robustly inefficient the NG would be. An inefficient NG with a large stability index thus rests a greater distance from the efficient frontier than does an inefficient NG with a smaller stability index.

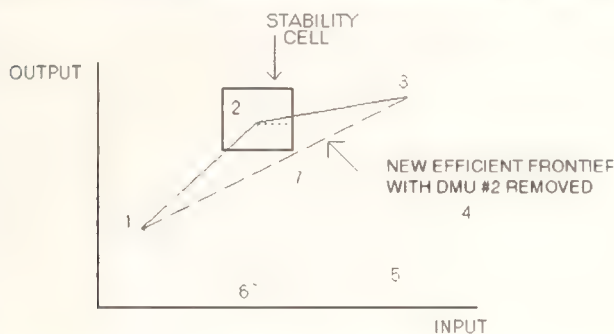


Fig. 2. Stability measure for efficient NG. Note: θ depicted as a dotted line segment when NG #2 is removed. That is the largest increase in inputs and decrease in outputs which will allow NG #2 to just remain efficient.

Mathematically, the stability index for an inefficient NG (NG_i) is determined by solving the following linear program:

$$\begin{aligned}
 &\max \quad \theta \\
 &\text{s.t.} \quad Y\lambda - s^+ - \theta d_0 = Y_i \\
 &\quad X\lambda + s \quad \theta d_1 = X_i \\
 &\quad e^T \lambda = 1 \\
 &\quad \lambda, s^+, s^-, \theta \geq 0
 \end{aligned} \tag{4}$$

where all notations are as defined in the prior formulations. Observe that θ simultaneously decreases inputs and increases outputs as the linear program determines the optimal solution. Fig. 3 provides a graphical depiction of the infinity-norm measure (stability cell) for inefficient NG 7.

Once the stability index is known for each NG, the NGs can be ranked from most robustly technically efficient to most robustly technically inefficient. To do so, the stability indices for inefficient NGs are first negated. This principle of ranking can be applied to NGs in reverse order from most efficient to most inefficient. NG relative efficiency then can be rank ordered from highest to lowest based on their stability index values. This use of the radii of stability provides a new way of implementing rankings.³ Also we have explicitly avoided measuring between-year shifts in annual frontiers using the Malmquist index, because of the autonomous changes that are associated with instabilities not originating from economic sources or government policy in many developing NGs in the 57 NG group.⁴

³ Charnes, Cooper, and Li (1989) specifies the principle on which rankings of decision making units (NGs in our case) can be based. Also see Cooper et al. (2001).

⁴ This paper emphasizes pure production efficiency. Past studies employing the Malmquist Index refer to the approximately 17 more stable OECD countries. We have restricted ourselves to measuring the existing frontier of a given year rather than measuring production function shifts using the Malmquist Index. With 57 NGs, especially including the 33 developing NGs, autonomous changes can occur such as famine, pestilence, war, weather shifts, tsunamis, volcanoes, earthquakes, and very importantly, regime changes in the more unstable NGs, all of which can shift the production frontier. The technical change portion of the Malmquist has been termed somewhat inaccurately, innovation on the positive side, or negative technical change on the negative side. Where large between-year changes in ranks for a particular NG occur, we prefer to examine the inputs and outputs directly to see why these autonomous changes may have affected technical efficiency.

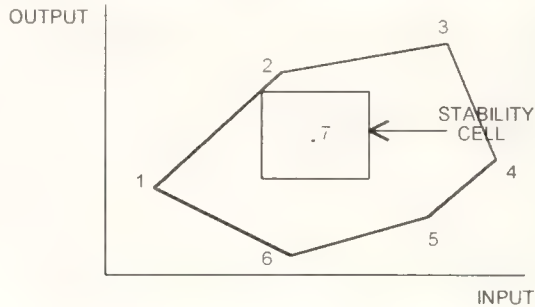


Fig. 3. Stability index measure for inefficient. Note: θ depicted as dotted line segment when the cell around NG #7 is enlarged until it barely touches the frontier, that is, the maximum simultaneous decrease in inputs and increase in outputs which will cause NG #7 to remain inefficient.

3. The data and empirical DEA Model

Our linear-programming approach to efficiency measurement incorporates a criterion that simultaneously maximizes GNP, and minimizes resource consumption. The GNP components include expenditures for consumption, gross investment, government consumption, and exports. This formulation of outputs confers an important role to investment and its contribution to future economic growth. These expenditures are all expressed in constant 1995 US dollars.

The appropriate resources (inputs) employed in production processes are more difficult to identify from the available data. The labor force represents labor availability. Arable land was defined in units of hectares and represents the land available for primarily agricultural production. Commercial energy use directly measures energy use in worldwide production techniques. However, Costello (1993) used electricity consumption (kilowatts per hour) as a proxy of capital usage for six of the OECD countries. She notes that electricity, like capital usage, cannot be easily stored, and the flow of electricity may well correspond to the flow of capital used in production. A similar argument can be offered for commercial energy use, but this broader measure may apply better to the larger array of worldwide production techniques, rather than to a smaller group of heavily industrial countries, as in the previous studies of production efficiency.

Net merchandise imports include imports of chemicals, basic and miscellaneous manufactures, and machinery and transport equipment. We exclude fuel imports because they are included in the commercial energy-use component. Service imports include the classifications of transport, communications, computer information and other services, and insurance and financial services. We expect that these service imports may be used primarily as inputs in production and, therefore, are to be minimized, rather than outputs to be consumed and, therefore, are to be maximized. However, travel imports have been explicitly excluded from service imports since some NG's outputs may well be comprised of tourist services, much of which may be interpreted as an output to be maximized. In any case, imports of communications, computer, and information services are rapidly outpacing

travel imports. With these inputs to be minimized and outputs to be maximized, the empirical DEA model is as follows:

Inputs (minimize resources):

Labor force (total)

Arable land (hectares)

Commercial energy use (kilotons of oil equivalent)

Net merchandise imports (merchandise imports less fuel imports in current US \$)

Net service imports (service imports less travel imports in Balance of Payments in current U.S. \$)

Outputs (maximize outputs):

Private consumption (constant 1995 U.S. \$)

Government consumption (constant 1995 U.S. \$)

Gross domestic investment (constant 1995 U.S. \$)

Exports of goods and services (constant 1995 U.S. \$)

Extensive missing cases for these nine variables limited the sample to 57 NGs out of 227 NGs in the CD-ROM version of the *2001 World Development Indicators*. Appendix A shows the data for the 57 NGs on which the DEA was performed. Note that the inputs and outputs were divided by each component's respective standard deviations. This technique is used to obtain a units invariant model. This normalizes the observations, and according to Lovell and Pastor (1995), assures that the DEA results will be both translation invariant and units invariant. Even after normalization, however, considerable variations in inputs and outputs exist across the 57 NGs. In the context of this model then, the efficient NG has comparable resources to other NGs in the frontier, but better employs its available resources to produce greater amounts of consumption, investment, government purchases and foreign export sales. Conversely, an efficient NG may similarly be viewed as having comparable outputs, or national product, but produces those outputs with fewer resources.

4. Basic empirical results: NG efficiency rankings using the additive DEA model

Table 1 displays the stability rankings for the 57 NGs for the combined eight years, as well as for the individual years 1991 to 1998. The NGs are ranked from most robustly efficient to the least robustly efficient for the combined period. The individual-year rankings seem relatively stable across years. Ireland exhibits significant improvement from near the bottom of the rankings to the 12th rank by 1998. The top of the list is headed by the United States and Japan and includes a number of the more prosperous OECD European NGs including Germany, France, Switzerland, Netherlands, Denmark, Belgium, Norway, Finland, Iceland, Ireland, and Sweden.

The top quartile also has some unexpected newcomers such as Brazil, China, India, and Bangladesh. Because of its low per capita income, Bangladesh unexpectedly occupies the fairly robust 14th rank. This counter-intuitive result can be explained by very low levels of per capita output, but even proportionately lower resource use, shown in Appendix A. Even though efficiency generally may be highly related to prosperity (we found a positive correlation between

Table 1
Country stability index rankings as efficiency rankings

Country Name	Region	1991	98	1991	1992	1993	1994	1995	1996	1997	1998
United States	North America	1		1	1	1	1	1	1	1	1
Japan	East Asia and Pacific	2		2	2	2	2	2	2	2	2
Germany	Europe	3		3	3	3	3	3	3	3	3
Brazil	South America	4		4	4	4	4	5	5	5	5
France	Europe	5		6	6	5	5	4	4	4	4
China	East Asia and Pacific	6		5	5	7	6	10	6	6	7
Switzerland	Europe	7		7	7	6	7	7	8	7	8
Netherlands	Europe	8		8	8	8	8	11	9	8	9
Denmark	Europe	9		10	10	10	9	13	14	9	11
Belgium	Europe	10		11	11	12	12	12	11	12	17
Norway	Europe	11		15	12	14	10	14	17	17	24
India	South Asia	12		16	9	9	11	19	12	18	49
Finland	Europe	13		28	22	11	15	23	19	11	14
Bangladesh	South Asia	14		19	14	16	16	20	21	13	15
Iceland	Europe	15		14	13	15	14	16	20	14	18
Ireland	Europe	16		33	32	29	24	17	18	16	12
Israel	Middle East and North Africa	17		12	15	18	20	22	22	20	21
Nicaragua	Central America	18		18	16	19	19	21	23	21	22
El Salvador	Central America	19		17	17	20	22	24	24	22	25
Uruguay	South America	20		21	20	21	23	25	26	23	26
Sweden	Europe	21		25	29	17	18	18	25	19	19
Honduras	Central America	22		24	19	23	25	30	27	28	29
Panama	Central America	23		20	21	22	28	35	34	24	30
Bolivia	South America	24		26	24	26	27	29	28	26	31
Costa Rica	Central America	25		22	26	24	26	31	30	27	27
Guatemala	Central America	26		27	31	30	31	32	31	29	32
Austria	Europe	27		29	30	27	29	33	32	25	20
Kenya	Sub-Saharan Africa	28		35	33	25	30	39	37	33	34
Ecuador	South America	29		32	27	28	33	36	33	36	39
Venezuela, RB	South America	30		43	48	47	17	26	16	32	47
Jamaica	Caribbean	31		23	23	31	32	38	39	35	35
Korea, Rep.	East Asia and Pacific	32		45	35	41	42	41	45	15	6
Tunisia	Middle East and North Africa	33		34	39	39	39	37	35	30	33
Colombia	South America	34		13	18	38	37	40	36	31	28
Morocco	Middle East and North Africa	35		36	38	34	40	43	40	34	36
Turkey	Middle East and North Africa	36		48	34	32	13	28	46	51	54
Greece	Europe	37		39	41	35	36	42	38	39	37
Romania	Europe	38		44	53	33	38	49	49	42	40
South Africa	Sub-Saharan Africa	39		40	44	45	44	47	29	37	23
New Zealand	East Asia and Pacific	40		30	36	37	41	46	44	38	38
Peru	South America	41		38	40	36	34	44	43	41	41
Chile	South America	42		31	37	42	35	45	42	46	43
Egypt, Arab Rep.	Middle East and North Africa	43		9	25	13	48	48	47	40	53
Portugal	Europe	44		42	42	44	45	51	48	45	44

Table 1 (continued)

Country Name	Region	1991–98	1991	1992	1993	1994	1995	1996	1997	1998
Pakistan	South Asia	45	51	47	50	43	15	15	48	42
Indonesia	East Asia and Pacific	46	49	45	52	51	53	53	52	13
Hungary	Europe	47	41	43	48	49	50	50	44	46
Mexico	Central America	48	57	57	57	56	8	7	10	10
Spain	Europe	49	46	51	43	47	27	41	47	51
Canada	North America	50	54	54	53	46	9	10	43	16
Poland	Europe	51	52	52	51	50	54	54	49	50
Australia	East Asia and Pacific	52	47	46	49	52	52	52	50	48
Italy	Europe	53	50	49	40	21	6	13	53	55
Malaysia	East Asia and Pacific	54	53	50	54	54	56	55	54	45
Philippines	East Asia and Pacific	55	37	28	46	53	55	56	55	56
United Kingdom	Europe	56	55	55	55	55	34	51	56	57
Thailand	East Asia and Pacific	57	56	56	56	57	57	57	57	52

GNP per capita and the stability indexes of $r = 0.369$ and significant at all levels), it is possible that a low per capita income or high level of destitution can be accompanied by relatively lower levels of resource use, appropriately resulting in robust efficiency.

On a matched pair comparison between two relatively homogenous Islamic bloc developing countries in the Indian sub-continent who were previously parts of the same country until 1971, Bangladesh's overall efficiency ranking for 1991–98 in Table 1 is 14th, compared to Pakistan's 45th, and their comparable respective average incomes are \$323 and \$496. Table 2 shows five inputs as a percent of four outputs' value, or 20 percentages for each NG. Bangladesh uses considerably fewer resources per dollar of outputs for 17 out of these 20 percentages (three exceptions are noted in bold print). Simply put, Bangladesh in maximizing very low outputs, and minimizing even lower resources, chooses a set of weights for outputs and inputs that confer a very high relative-efficiency score.

Table 2
Matched pair NGs inputs as a percent of output

Country	Efficiency rank (Average per capita GDP)	Commercial energy use (%)	Land use (%)	Labor force (%)	Merchandise imports (%)	Services imports (%)
<i>Bangladesh's</i>						
<i>Outputs</i>						
Consumption	14 (\$232)	151	577	14	103	45
Investment		620	238	57	423	186
Gov't purchases		218	836	20	149	66
Exports		238	910	22	162	71
<i>Pakistan's</i>						
<i>Outputs</i>						
Consumption	45 (\$496)	293	1018	707	146	158
Investment		424	1484	1031	213	231
Gov't purchases		460	1609	1118	231	250
Exports		277	965	670	138	150

Spain, Canada, Australia, Italy, and the United Kingdom have relatively high standards of living (See Table 3, High GDP per capita) and apparently very low robust efficiency (bottom decile of Table 1). These NGs have moderate per capita outputs, but Australia and Canada have relatively high levels of arable land; and Canada, Italy, the United Kingdom, and Spain have relatively high merchandise and service imports. These NGs exhibit fairly high per capita outputs, but also very high use of a number of inputs. This explanation is the logical opposite of Bangladesh's case for robust efficiency (as we have just explained).

5. Comparison of the results of the additive and CCR models

The additive model, as a variable-returns-to-scale model, measures only technical efficiency and allows an efficiency comparison between NGs of different sizes using a singular, technical efficiency metric, but ignores scale efficiency. The additive model frontier is comprised of the most technically efficient NGs of a particular size range, and less efficient economies of various sizes are compared to that portion of the frontier for that particular reference set. In constant-returns-to-scale models like the CCR, the frontier is

Table 3

Additive versus CCR Models 1991–1998

Variable-returns-to-scale (VRS) results				Constant returns-to-scale (CRS) results	
Additive model			BCC model	CCR model	
Efficiency rank (ER)	Country	Stability index	Omega (ω)	Country	Efficiency score
1	United States	3.6271	0.7869	Bangladesh	1.0000
2	Japan	2.3225	0.6351	Belgium	1.0000
3	Germany	0.7348	0.4355	Brazil	1.0000
4	Brazil	0.2475	0.3918	China	1.0000
5	France	0.1584	0.2892	Denmark	1.0000
6	China	0.1199	0.1940	Finland	1.0000
7	Switzerland	0.0864	0.1284	France	1.0000
8	Netherlands	0.0514	0.1278	Germany	1.0000
9	Denmark	0.0198	0.1275	Iceland	1.0000
10	Belgium	0.0137	0.1127	India	1.0000
11	Norway	0.0131	0.1095	Ireland	1.0000
12	India	0.0108	0.0966	Israel	1.0000
13	Finland	0.0102	0.0949	Japan	1.0000
14	Bangladesh	0.0096	0.0849	Netherlands	1.0000
15	Iceland	0.0096	0.0631	Norway	1.0000
16	Ireland	0.0068	0.0626	Sweden	1.0000
17	Israel	0.0059	0.0576	Switzerland	1.0000
18	Nicaragua	0.0040	0.0575	United States	1.0000
19	El Salvador	0.0034	-0.8574	Austria	0.9774
20	Uruguay	0.0025	-0.8983	Korea, Rep	0.9668
21	Sweden	0.0024	-1.3159	Venezuela, RB	0.9351
22	Honduras	0.0012	-4.1801	Turkey	0.9303
23	Panama	0.0009	-7.0703	Spain	0.9266
24	Bolivia	0.0005	-13.2860	South Africa	0.9215
25	Costa Rica	0.0005	-25.2455	Mexico	0.9091

(continued on next page)

Table 3 (continued)

Variable-returns-to-scale (VRS) results				Constant returns-to-scale (CRS) results	
Additive model			BCC model	CCR model	
Efficiency rank (ER)	Country	Stability index	Omega (ω)	Country	Efficiency score
26	Guatemala	-0.0004	0.1102	Italy	0.8994
27	Austria	-0.0010	-2.2988	Indonesia	0.8991
28	Kenya	-0.0018	0.1153	Greece	0.8669
29	Ecuador	-0.0019	0.0270	Canada	0.8623
30	Venezuela, RB	-0.0026	-1.1879	Chile	0.8597
31	Jamaica	-0.0030	0.1095	Colombia	0.8570
32	Korea, Rep.	-0.0031	0.0909	Australia	0.8467
33	Tunisia	-0.0033	-2.2988	New Zealand	0.8286
34	Colombia	-0.0035	0.0909	United Kingdom	0.8270
35	Morocco	-0.0053	0.1060	Malaysia	0.7958
36	Turkey	-0.0056	0.1033	Uruguay	0.7891
37	Greece	-0.0059	-0.8150	Ecuador	0.7785
38	Romania	-0.0060	0.0631	Tunisia	0.7721
39	South Africa	-0.0064	0.1153	Portugal	0.7622
40	New Zealand	-0.0069	0.0441	Egypt, Arab Rep.	0.7321
41	Peru	-0.0071	0.0631	Honduras	0.7286
42	Chile	-0.0073	0.0575	Guatemala	0.7251
43	Egypt, Arab Rep.	-0.0117	0.0966	Morocco	0.7246
44	Portugal	-0.0122	0.0909	Romania	0.7151
45	Pakistan	-0.0157	0.0631	Poland	0.7092
46	Indonesia	-0.0159	0.0631	Costa Rica	0.7073
47	Hungary	-0.0163	0.0261	Hungary	0.7031
48	Mexico	-0.0196	0.0441	Peru	0.6979
49	Spain	-0.0205	0.0257	Thailand	0.6902
50	Canada	-0.0212	0.0631	Panama	0.6837
51	Poland	-0.0260	0.0944	Kenya	0.6758
52	Australia	-0.0264	0.0631	El Salvador	0.6533
53	Italy	-0.0374	0.0944	Bolivia	0.6308
54	Malaysia	-0.0431	0.0631	Pakistan	0.6279
55	Philippines	-0.0432	0.0441	Philippines	0.6142
56	United Kingdom	-0.0611	0.0575	Jamaica	0.5718
57	Thailand	-0.0751	0.0575	Nicaragua	0.4613

comprised of the most technically efficient NGs across all of the size ranges and less efficient NGs in other size ranges are compared to the most efficient countries without regard to (their) scale of operation. Thus different sized economies will be ranked differently when the additional scale criterion is imposed by the CCR model.

A comparison of the frontiers for the additive, variable-returns-to-scale (VRS) model and the CCR or constant returns-to-scale (CRS) model provides a type of scale analysis. NGs comprising the frontier in the CRS model are both technically efficient and scale efficient, while the frontier economies identified in the VRS model are only technically efficient and therefore may not appear in the CRS envelope. In Table 3 the additive model's frontier (shaded in the table) contains 25 technically efficient NGs (with positive stability-index values) and the CCR frontier (also shaded in the table) contains only 18 technically

and scale efficient NGs (first 18 alphabetically ranked efficiency scores of unity). In Table 3 these seven technically but not scale efficient NGs that were the least robustly efficient out of lowest eight (with Sweden being the exception) were from Central and South America including: Nicaragua, El Salvador, Uruguay, Honduras, Panama, Bolivia, and Costa Rica. These seven NGs appear at the bottom of the CCR frontier.

By examining the dual of the BCC model, an intercept of a facet on the frontier can be used to indicate whether scale economies or diseconomies exist. This term, sometimes referred to as omega, ω , identifies returns to scale in the sense that the numerical value of zero occurs if the projected facet goes through the origin of the output scale. If $\omega < 0$, then the NG has a steep facet or transformation function and experiences increasing returns to scale. If $\omega > 0$, then the NG has a flat facet and experiences decreasing returns to scale. These seven NGs in Table 3 exhibit significant decreasing returns to scale, and when highlighted in the CCR model column, the imposition of the scale criterion substantially lowers their efficiency ratings. Thus these NGs are technically efficient when they help to define the reference set for their peers, but they exhibit substantial decreasing returns to scale when they are compared to the most efficient NGs of all sizes on the 57 NGs frontier.

6. Sensitivity analyses: partitioning the frontier into high and low per capita GNP

A major contribution of this paper has been to compare the relative efficiency of developed and developing NGs using a common metric, as documented in Table 1. The significant correlation between material well-being (average GDP per capita) and efficiency (Spearman correlation $r = 0.225$ and significant at the 10% level), suggests that partitioning the 57 NGs into high and low per capita income may yield some further insights into the relative-efficiency analysis of the two groups. The 57 NGs were ranked by average 1991–98 per capita GNP and an obvious gap of \$6000–\$10,000 resulted. For the 24 NGs in the high per capita income group, Switzerland had the highest average GDP per capita (PPP current international \$) of \$46,195 and the Republic of Korea had the lowest with \$10,264. For the 33 low per capita income NGs, Uruguay had the highest average GNP per capita of \$5675 and Bangladesh had the lowest with \$323. The purpose of the partitioning NGs into more homogeneous per capita income groups is to form two separate frontiers, where the high income frontier and the resulting stability index rankings will not be compared to some highly efficient low income NGs, and the low income frontier will not be compared to some highly efficient high income NGs.

This rationale for partitioning the 57 NGs by income is reinforced by the high Spearman rank correlation of $r = 0.980$ between the 24 ranked stability-index values selected from the full 57 NG frontier in Table 1 and the 24 high income NG frontier, suggesting that the frontiers are very nearly identical. One might additionally expect that the 33 low GDP per capita NGs' frontier might well be very different, since the generally more efficient, large economies will not be used to establish the frontier of the 33 developing economies.

Table 4 displays the stability index rankings for the low and high average per capita GNP frontiers for the combined 1991–98 period. For the 57 NGs' frontier, a positive relationship exists between income (average per capita GNP in Table 4) and efficiency (stability index values in Table 3) with a Spearman correlation of $r = 0.225$ that is significant at the 10% level. For the 24 high income NGs' frontier, a Spearman correlation $r = 0.708$ between the

income and efficiency was significant at all levels. However, for the 33 low income NGs' frontier, a Spearman correlation $r = 0.260$ was not significant at any acceptable significance level. Clearly significant differences exist between the two partitioned frontiers, and one might conjecture that this higher correlation for the more prosperous NGs exists because of a strong relationship between efficiency and high standards of living.

The high per capita income frontier contains the 18 OECD NGs used in the Lovell, Pastor, and Turner (1995) macroeconomic performance rankings (1970–90) and our efficiency rankings. Correlating Lovell et al.'s 18 OECD NGs to our 24 NGs' frontier, a Pearson correlation of $r = 0.667$ is significant at the 1% level. Even though our frontier covers a subsequent time period, and our model employs somewhat different inputs and outputs, these ranking appear quite robust in their measurement of fundamental economy-wide efficiency. This result indirectly lends credibility to the 33 low GDP NGs' frontier.

Several observations are in order regarding Tables 3 and 4. First note that in Table 3 stability-index rankings for the top NGs are almost identical to Table 1. Similarly, as we move down the list, there is incremental upward drift from past rankings because the exit of low GNP per capita NGs makes room for efficiency gains by NGs with high GNP per capita. Equally noteworthy are the NGs at the bottom of the list in Table 3, these NGs are almost identical to the frontier based on 24 high GNP NGs in Table 4, and include countries like Spain, New Zealand, Canada, Australia, and the United Kingdom. These subsets of NGs have low robust efficiency in both tables.

The new frontier of 33 low GNP NGs includes some high efficiency economies with high value petroleum and mining interests like Malaysia, Mexico, Indonesia, South Africa, Colombia, and Venezuela that have moved up in efficiency rankings. Equally noteworthy, some NGs have had consistently high relative efficiency under both frontiers despite low GNP per capita, such as China, Indonesia, India, and Bangladesh. With the exception of these differences involving the low income NGs, the 57 NG frontier and the high GNP frontier appear quite similar.

7. Worldwide efficiency rankings and related measures

Since there exist no independent validity checks of NG performance rankings, we investigated whether any institutional indicators may be associated with the efficiency rankings. We hypothesized that relative-efficiency rankings of large numbers of NGs may be closely associated with institutional, economic, and political variables. A composite index, *The Market Potential Indicators for Emerging Markets – 2002*, is employed in this section. Of eight component rankings, *a priori* we selected four of these rankings as being directly related to sustainable NG efficiency: (1) the market-size dimension defined as urban population in millions; (2) the market-intensity dimension including the variables GDP per capita and private consumption as a percentage of GDP; (3) market-consumption capacity dimension defined as the percentage share of middle class (middle 50%) in consumption income; and (4) the economic-freedom dimension represented by the Economic Freedom Index and the Survey of Political Freedom. We selected the variables that were employed directly in forming these rankings (except for the political and economic freedom indexes that are inherently subjectively defined) and regressed them against the stability-index values.

Table 4

Stability index values and rankings (1991–1998)

High GNP countries				Low GNP countries			
Rank	Country	Avg 1991–1998	Stability index	Rank	Country	Avg 1991–1998	Stability Index
GNP per capita				GNP per capita			
1	United States	\$27,631.51	3.6271	1	Brazil	\$4,258.63	0.6942
2	Japan	\$41,785.78	2.3225	2	China	\$547.52	0.5400
3	Germany	\$29,925.71	0.7348	3	Malaysia	\$3,927.26	0.2193
4	France	\$26,790.90	0.2021	4	Mexico	\$3,220.90	0.0779
5	Iceland	\$26,239.63	0.1189	5	Indonesia	\$946.56	0.0246
6	Switzerland	\$46,195.32	0.0879	6	Colombia	\$2,291.08	0.0243
7	Netherlands	\$27,197.93	0.0514	7	India	\$367.16	0.0159
8	Denmark	\$33,442.89	0.0198	8	South Africa	\$3,806.12	0.0120
9	Belgium	\$27,387.63	0.0137	9	Venezuela, RB	\$3,477.51	0.0109
10	Norway	\$32,674.29	0.0131	10	Bangladesh	\$322.75	0.0101
11	Finland	\$24,794.48	0.0102	11	Chile	\$4,300.22	0.0065
12	Ireland	\$16,669.90	0.0068	12	El Salvador	\$1,585.57	0.0063
13	Israel	\$15,094.86	0.0059	13	Turkey	\$2,893.04	0.0061
14	Sweden	\$26,167.32	0.0024	14	Jamaica	\$1,683.30	0.0059
15	Austria	\$28,909.64	−0.0010	15	Uruguay	\$5,675.16	0.0051
16	Greece	\$11,694.44	−0.0030	16	Costa Rica	\$3,315.21	0.0045
17	Korea, Rep	\$10,263.60	−0.0031	17	Nicaragua	\$346.86	0.0040
18	New Zealand	\$14,891.03	−0.0069	18	Thailand	\$2,567.49	0.0038
19	Spain	\$14,887.33	0.0106	19	Panama	\$2,843.31	0.0027
20	Portugal	\$10,827.38	−0.0111	20	Philippines	\$1,118.43	0.0027
21	Canada	\$18,833.04	−0.0212	21	Tunisia	\$1,945.88	0.0020
22	Australia	\$19,840.18	−0.0246	22	Honduras	\$657.70	0.0014
23	Italy	\$18,688.57	−0.0374	23	Bolivia	\$869.86	0.0011
24	United Kingdom	\$19,066.27	0.0611	24	Peru	\$2,073.02	0.0002
				25	Guatemala	\$1,433.66	0.0000
				26	Ecuador	\$1,508.44	−0.0002
				27	Morocco	\$1,279.00	−0.0002
				28	Kenya	\$324.30	−0.0012
				29	Hungary	\$4,254.81	−0.0022
				30	Romania	\$1,329.06	−0.0041
				31	Egypt, Arab Rep	\$1,037.61	−0.0052
				32	Pakistan	\$496.56	−0.0126
				33	Poland	\$2,887.91	−0.0181

The stability-index values are treated as the dependent variable and are compared to the three frontiers of all 57 NGs, the 24 higher GNP frontier, and the 33 lower GNP frontier. The envelopes themselves were recalculated for the years 1996–98 to correspond more closely to the years in which the independent variables were collected. Our model includes three-year averages for the independent variables of urban population (million), and GNP per capita estimated using PPP (United States Dollars). Selected years within the 1996–98 period describe percentage share of the middle class (middle 60%) in consumption/income (latest year available), Economic Freedom Index, and Survey of Political Freedom expressed as subjective rankings. The results of the three models are presented in Table 5. In the 57 NG model, Eq. (2), urban population, along with GNP per capita, private consumption as a

Table 5
Institutional determinants of stability index values

Models independent variables	Complete envelope of 57 countries	Higher income 24 countries	Lower income 33 countries
	(1)	(2)	(3)
Urban population ^a	0.000,000,004***	−0.000,000,001***	−0.000,000,007***
GNP per capita ^b	0.000,028***	0.000,012**	0.0001**
Private consumption % of GDP ^c	0.023***		
Percentage share of middle 10% ^c consumption income ^c			
Economic freedom ^c	0.210*		
Political freedom ^d			0.000*
Constant	−2.377***	0.426***	−0.649**
R ²	.453	.896	.631
F	10.8***	90.7***	16.5***

*** Significant at .01 level ** Significant at .05 level * Significant at .10 level.

^aAveraged from 1996–98 from World Bank *World Development Indicators*, 2001 CD.

^bAveraged from 1996–98 Estimates using PPP (US dollars) — 2000

^cAveraged from 1996–98 from World Bank *World Development Indicators*, 2001 CD.

^dAveraged from 1996–98 from World Bank *World Development Indicators*, 2001 CD.

^eAveraged from 1996–98 from World Bank from Heritage Foundation, *The Index of Economic Freedom*, 2002

^fAveraged from 1996–98 from Freedom House, *Survey of Freedom in the World*, 2001/2002.

percent of GDP, and the economic freedom index are significant at the 10% level. Similar results are noted for the high GNP NGs and the low GNP NGs, except that for the lower income NGs, the political freedom index is not quite significant at $\alpha = .106$. These somewhat differential results seem to validate the partitioning of the 57 NG frontier, and also seem to provide a useful means of assessing development policy. This analysis indicates that urbanization is strongly associated with the measurement of NG production efficiency.

8. Summary and governance implications

The main contribution of this study is to provide a generalized linear-programming approach to international production-efficiency rankings, which can be applied to a wide range of NGs in various stages of sustainable development. Although our approach is comparable to Lovell and Pastor (1998), we provide stability rankings that are easily interpretable by decision makers and comparable across a wide range of NGs, developing and developed. Our approach has the advantage of comparing a large number of NGs in various stages of sustainable development on a comparable metric of inputs and outputs, allowing the individual NGs to choose appropriate transformation frontiers in determining the relationships between inputs and outputs.

Our results are generally consistent with earlier productivity growth accounting studies, particularly those related to the OECD countries. However, there are also some new counter-intuitive insights to be gained from this approach: some less developed NGs seem to be sustained by rather high levels of efficiency, given their choice of inputs and outputs. While our choice of inputs and outputs was motivated by incremental contribution to overall sustainable efficiency, it is noteworthy that the choice of inputs and outputs may influence stability index rankings.

These results, subject to the caveats implied by econometric assumptions and choice of inputs and outputs, do have implications for sustainable resource-allocation decisions (both at the national and international levels) and country risk analysis for investment, credit, and foreign aid decisions by international agencies. As in Adam Smith (1953) cited earlier, NGs could follow very “different plans [input and output mix in our DEA context] in the general conduct or direction” to sustainable productivity growth. For example, the Bangladeshi strategy to sustainable productivity growth need not be identical to that of the United States. In this sense, a “cookie cutter” approach to productivity growth (or development) often imposed by an international lender or agency such as the IMF or World Bank could be ineffective, if not detrimental, to the sustainable productivity growth of a less developed country. It appears that sustainable productivity growth models for “nations tolerably well advanced as to skills, dexterity and judgment in application of labor” need not be the same as for those NGs who are not nearly as “well advanced as to skills, dexterity and judgment in the application of labor” and other inputs in order to generate and sustain a certain level of outputs. Economic development and productivity growth in the post World War II period have largely followed the footsteps of the more developed NGs-high GNP frontier in our analysis or OECD countries in the earlier studies (Solow, 1987). Perhaps, it’s time for the less developed NGs to try not to simply mimic the more developed NGs. Instead, every NG needs to take a serious look at its own history, religious diversity, demographic trends, and comparative advantage regarding the inputs and input mix vis-à-vis the desired level of output within the context of global economy. In short, one generic model of sustainable productivity growth may not fit all NGs. Every NG needs to tailor its strategic plan for sustainable productivity growth, keeping in mind its own relative advantages in terms of inputs and outputs.

One of the more interesting policy questions that arise from our empirical findings is as follows: Should an international lending agency such as the World Bank or IMF allocate more resources to NGs with higher or lower efficiency scores? We respond to this question at two levels. Strictly speaking, on the grounds of investor protection and production efficiency, NGs with higher efficiency scores are more likely to make more productive uses of these resources than those with lower efficiency scores. However, production efficiency might be one of the many factors influencing policy makers. For example, on the grounds of sustainable and equitable global development, one could argue that NGs with low efficiency scores should be provided with more resources to see if that will help them improve and sustain their efficiency. Although some infra-structural resources are indispensable for any NG to sustain and equitably compete in the global economy, there is little or no evidence that more resources beyond a certain threshold necessary for minimum sustainability will provide incentives to the NG to be more efficient.

Finally, we believe that production efficiency should be as important a consideration as the aggregate wealth measured by GDP and GNP in sustainable resource-allocation decisions at the national and international public and private sector levels. Comparative statistics that are simply based on aggregate measures such as GNP and GDP without accounting for productivity growth can be inadequate if not misleading. At this point, we do not have a good understanding of how productivity growth measures are precisely impounded by the international financial and commodity markets into the pricing of foreign currency, commodities, and foreign (and national) bond ratings; that would certainly be a fruitful direction to follow from these results.

Appendix A. World development indicators, 1999

Standardized country data (1991-1998)										
	Commercial energy use (kt of oil equivalent)	Land use, arable land (hectares)	Labor force, total	Merchandise imports (current US\$)	Service imports (BoP, current US\$)	Household final consumption expenditure, etc (constant 1995 US\$)	General government final consumption expenditure (constant 1995 US\$)	Gross fixed capital formation (constant 1995 US\$)	Exports of goods and services (constant 1995 US\$)	
Raw data scaled by STDEV										
Australia	0.3107	1.3721	0.0846	0.4546	0.5516	0.2538	0.3876	0.3151	0.4578	
Austria	0.0883	0.0309	0.0347	0.4588	0.8079	0.1698	0.2600	0.2016	0.5874	
Bangladesh	0.0589	0.2257	0.5450	0.0402	0.0177	0.0301	0.0095	0.0095	0.0248	
Belgium	0.1749	0.0221	0.0388	1.1579	1.1105	0.1933	0.3308	0.2133	1.2044	
Bolivia	0.0118	0.0496	0.0274	0.0117	0.0173	0.0066	0.0049	0.0043	0.0090	
Brazil	0.4940	1.4235	0.6701	0.3565	0.4000	0.4874	0.5071	0.5071	0.3433	
Canada	0.7373	1.2796	0.1480	1.3369	1.1701	0.4262	0.7041	0.3965	1.3476	
Chile	0.0612	0.0675	0.0518	0.1167	0.1131	0.0508	0.0355	0.0350	0.1257	
China	3.2552	3.4804	6.6617	0.9441	0.6223	0.3998	0.4414	0.8331	1.0286	
Colombia	0.0930	0.0606	0.1484	0.0933	0.0953	0.0755	0.0788	0.0655	0.0901	
Costa Rica	0.0079	0.0066	0.0170	0.0320	0.0300	0.0300	0.0088	0.0081	0.0283	
Denmark	0.0670	0.0681	0.0274	0.3279	0.4398	0.1169	0.2874	0.1228	0.4109	
Ecuador	0.0246	0.0449	0.0391	0.0306	0.0410	0.0155	0.0126	0.0121	0.0327	
Egypt, Arab Rep	0.1173	0.0751	0.1947	0.0913	0.0993	0.0597	0.0349	0.0395	0.0831	
El Salvador	0.0109	0.0162	0.0211	0.0198	0.0161	0.0099	0.0048	0.0086	0.0127	
Finland	0.0992	0.0623	0.0242	0.2133	0.2744	0.0800	0.0606	0.0878	0.3958	
France	0.7914	0.5134	0.2390	2.9837	5.2800	1.1157	2.0716	1.036	2.2347	
Germany	1.1157	0.3303	0.3799	3.4589	3.8892	1.7923	2.6844	2.0504	3.0655	
Greece	0.0752	0.0813	0.0410	0.2047	0.1378	0.1117	0.0995	0.0862	0.331	
Guatemala	0.0168	0.0377	0.0327	0.0254	0.0212	0.0158	0.0044	0.0080	0.0155	
Honduras	0.0092	0.0472	0.0186	0.0107	0.0107	0.0033	0.0027	0.0036	0.0113	
Hungary	0.0831	0.1356	0.0447	0.1339	0.1075	0.0303	0.0377	0.0381	0.132	
Iceland	0.0071	0.0062	0.0014	0.0150	0.0238	0.0087	0.0081	0.0048	0.0168	
India	1.3879	4.5648	3.7193	0.2577	0.2703	0.3076	0.2922	0.2922	0.2580	
Indonesia	0.3774	0.5010	0.8260	0.2738	0.4017	0.1620	0.0844	0.1935	0.3406	
Ireland	0.0374	0.0366	0.0133	0.2808	0.4205	0.0472	0.0610	0.0481	0.3217	
Israel	0.0509	0.0999	0.0211	0.2144	0.2650	0.0652	0.0749	0.0749	0.1640	

continued on next page

Appendix A (continued)

Standardized economic data (1999–1998)									
	Commercial energy use (kt of oil equivalent)	Land use (arable land (hectares))	Labor force (total)	Merchandise imports (current US\$)	Service imports (BoP current US\$)	Household final consumption expenditure etc. (constant 1995 US\$)	General government final consumption expenditure (constant 1995 US\$)	Gross fixed capital formation (constant 1995 US\$)	Exports of goods and services (constant 1995 US\$)
<i>Raw data scaled by STD4</i>									
Italy	0.589	0.2408	0.2343	1.5751	1.5753	0.8418	1.1213	0.7714	1.7532
Japan	0.0111	0.0046	0.0119	0.0200	0.0341	0.0034	0.0034	0.0051	0.0162
Japan	0.590	0.1307	0.6198	2.3582	3.5158	3.0781	2.7706	5.6391	3.1229
Korea	0.0437	0.1176	0.1231	0.0293	0.0244	0.0082	0.0067	0.0054	0.0182
Korea Rep	0.4869	0.0510	0.2028	0.8983	0.7287	0.3353	0.2663	0.6025	0.9153
Malaysia	0.1175	0.0816	0.0760	0.4892	0.4288	0.0513	0.0524	0.1192	0.4795
Mexico	0.4427	0.6993	0.5274	0.7042	0.4062	0.2628	0.1668	0.2242	0.5315
Norway	0.0269	0.5526	0.0939	0.0682	0.0590	0.0303	0.0336	0.0275	0.0576
Netherlands	0.2382	0.0251	0.0667	1.2681	1.4831	0.2653	0.5889	0.3216	1.5227
New Zealand	0.0516	0.0509	0.0166	0.0976	0.1453	0.0465	0.0400	0.0427	0.1124
Nicaragua	0.0077	0.0651	0.0188	0.0086	0.0068	0.0020	0.0017	0.0017	0.0046
Norway	0.0763	0.0259	0.0207	0.2803	0.4539	0.0933	0.1728	0.1190	0.3572
Pakistan	0.1689	0.8906	0.4103	0.0846	0.0919	0.0580	0.0398	0.0367	0.0612
Panama	0.0068	0.0141	0.0098	0.0202	0.0362	0.0062	0.0068	0.0068	0.0196
Peru	0.0416	0.1017	0.0758	0.0613	0.0618	0.0461	0.0283	0.0469	0.0427
Philippines	0.1094	0.1548	0.2588	0.2082	0.2261	0.0700	0.0487	0.0609	0.1652
Poland	0.3269	0.3991	0.1794	0.2427	0.1751	0.0914	0.1015	0.0817	0.1741
Portugal	0.0611	0.0601	0.0460	0.2580	0.2067	0.0904	0.1109	0.0914	0.2080
Romania	0.1476	0.2632	0.0992	0.0776	0.0498	0.0267	0.0223	0.0230	0.0512
South Africa	0.3269	0.4083	0.1409	0.2109	0.1774	0.1210	0.1633	0.0882	0.2197
Spain	0.3280	0.4127	0.1550	0.8821	0.7483	0.1583	0.5880	0.4904	0.8331
Sweden	0.1630	0.0784	0.0443	0.4731	0.6109	0.1583	0.3580	0.1423	0.5969
Switzerland	0.0832	0.0116	0.0348	0.8933	0.4625	0.2411	0.2486	0.2416	0.7091
Iceland	0.1981	0.4787	0.3203	0.4494	0.4918	0.1107	0.0901	0.2103	0.3942
Tunisia	0.0211	0.0515	0.0307	0.0579	0.0420	0.0145	0.0168	0.0170	0.0500
Turkey	0.2019	0.7062	0.2556	0.2781	0.1914	0.1542	0.1040	0.1589	0.2306
United Kingdom	0.7304	0.1751	0.5717	2.1004	2.1260	0.9327	1.2393	0.7037	2.0045
United States	6.7379	5.0616	1.2458	8.9601	4.8723	6.3527	6.3978	4.8726	5.1874
Uruguay	0.0086	0.0355	0.0134	0.0232	0.0261	0.0176	0.0123	0.0096	0.0227
Venezuela, RB	0.1647	0.0767	0.0783	0.1029	0.1604	0.0695	0.0312	0.0519	0.1334

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Quarterly reporting in a voluntary disclosure environment: Its benefits, drawbacks and determinants

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Abstract

We primarily examine three issues pertaining to quarterly reporting: its benefits, drawbacks and determinants. This study is conducted in a voluntary-disclosure environment with respect to reporting quarterly earnings. On the benefits side, we find that quarterly reporting is associated with higher analyst following, and on the drawbacks side we find it is associated with high price volatility. If left to its own discretion, we find that a firm with high growth prospects, large size and a technology orientation is likely to disclose earnings on a quarterly basis.

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Keywords: Quarterly reporting; Analyst following; Online announcements; Liquidity; Price volatility; Earnings management; Determinants

1. Introduction

In the United States, quarterly reporting was mandated in 1970. Subsequent research on U.S. firms has revealed that quarterly earnings are value-relevant and provide performance

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information in a timelier manner than semiannual earnings (Butler, Kraft, & Weiss, 2005; Landsman & Maydew, 2002). Nonetheless, quarterly reporting has been met with stiff opposition in other parts of the world. In 2004, the European Union (European) Parliament rejected the proposal to mandate the use of quarterly reporting because of the concerns voiced by various sections of the capital market (IFLR, 2004; Schlesinger, 2004). Singapore, a major Asian stock market, introduced quarterly reporting in 2003 with both support and resistance from the business community. Its regulatory authorities continue to monitor its usefulness amidst concerns about its drawbacks (Straits Times, 14 January 2006). Unresolved scenarios also exist in other parts of the world, e.g., in Australia (Carnegie, 2004).

In the debate over quarterly reporting, those in favor believe that the more frequent reporting of earnings increases analyst following of firms, improves timeliness of earnings, and, improves stock trading. Those in opposition argue that it encourages short-termism, which can lead to earnings management and stock price volatility, and feel that quarterly reporting should be left as a voluntary form of disclosure.

While the issue of quarterly reporting is being debated, a new form of reporting has emerged—the online reporting of corporate events and actions on the websites of stock exchanges and other information intermediaries. In comparison with quarterly reporting, this form of disclosure is considered to be timelier for reporting price-sensitive information (Debreceeny & Rahman, 2005). Some opponents of quarterly reporting favor online corporate announcements (Carnegie, 2004).

In this paper, we examine the pros and cons of quarterly reporting in a voluntary disclosure environment that is also experiencing an increasing level of online reporting of corporate announcements. We also attempt to identify the reasons for choosing quarterly reporting in this environment. By choosing a voluntary-disclosure setting, we can examine the effectiveness of, and reasons for quarterly reporting without the intervention of the regulators. The particular disclosure setting chosen is Singapore prior to mandating quarterly reporting but after the introduction of online announcement. Although the stock exchange requires firms to disclose price-sensitive information, the determination of what is price sensitive is left to the discretion of the firms (Debreceeny & Rahman, 2005).

Our base sample consists of 520 Singapore Exchange (SGX) listed firms for 2001, of which 66 disclosed their earnings quarterly and all others were semiannual reporters. The actual sample for our analyses vary in size depending on the availability of data for the relevant variables of specific tests. By being flexible, we maximize the sample size for most analyses. We are constrained from increasing the sample by adding more years because of limited data availability for online announcements of prior years and the changing institutional arrangements for disclosure across years.

Our findings are that analyst following is high for quarterly reporters. However, they also have high stock price volatility. In addition, we find that if left to their discretion, firms with high growth prospects, larger size, and a technology base are likely to adopt quarterly reporting of earnings. However, we note that online reporting is also positively associated with analyst following, and is, additionally, positively associated with liquidity and negatively associated with earnings management. We conclude that as expressed by its proponents and adversaries, quarterly reporting has its benefits and drawbacks, and in the contemporary reporting environment, online reporting seems to play a strong role in keeping the market better informed.

In addition, we find that analysts also contribute to stock liquidity and to reducing earnings management, implying that they help enhance stock trading and act as monitors of firms.

This paper makes several contributions. First, it tests the efficacy of quarterly reporting in a disclosure environment with no regulatory intervention for quarterly reporting. Second, it tests the efficacy of online reporting as a competing source of frequent disclosures. Third, by conducting the study in a voluntary quarterly-reporting environment, we attempt to discover firm-specific reasons for quarterly disclosure. Fourth, we directly test the major policy question, i.e., whether or not to mandate quarterly reporting after taking into consideration the context in which the policy will be implemented.

Finally, we extend the disclosure literature in accounting into the area of frequency of disclosure. Prior studies have examined the efficacy of the level of disclosure in annual reports (Botosan, 1997), the disclosure of specific information, e.g., segment information (Botosan & Harris, 2000), and the expanded disclosure of earnings information (Healy, Palepu & Hutton, 1995). Most studies of the frequency issue compare the usefulness of quarterly earnings with those of semiannual earnings (Butler et al., 2005). In this study, we not only examine the efficacy of quarterly reports in comparison with the efficacy of semiannual reports, we do this examination along with an assessment of the efficacy of online reporting and the presence of information intermediaries. Although some prior studies examine the informativeness of competing sources of information (Francis, Schipper, & Vincent, 2002a), they focus on their immediate market effects; e.g., the cumulative abnormal returns surrounding their releases. In that manner, they find little difference between the efficacies of the competing sources. We, on the other hand, examine the longer-term effects, e.g., effects on analyst following, liquidity, earnings timeliness, earnings management, and stock price volatility.

The remainder of this paper is organized in the following manner: The second section deals with the disclosure setting of our choice and the identification of the research questions. The third section describes the hypotheses and specifies the research models. The fourth section describes the sample selection, sources of data, the descriptives and the bivariate correlations. The fifth section provides a discussion of the multivariate results. Section six draws the conclusions, identifies the limitations of this study and provides suggestions for future research.

2. The disclosure setting and the research questions

Singapore provides an ideal setting for evaluating the usefulness of quarterly reporting in the new information environment of firms. Up until 2002, quarterly reporting was optional for listed companies in Singapore. At the same time, arrangements were put in place for firms to make online disclosures of price-sensitive information, where the determination of what was price sensitive was left to the discretion of the company managers (Debreceeny & Rahman, 2005). This setting allows us to ascertain the pros and cons of quarterly reporting without any regulatory biases and helps us understand the firm-specific reasons for the adoption of quarterly reporting when more frequent forms of disclosure could also be used by companies.

2.1. Institutional developments in quarterly reporting in Singapore

The Disclosure and Accounting Standards Committee (DASC) in Singapore proposed the idea of mandatory quarterly reporting for listed companies in May 2001 (Ministry of Finance

Media Release, 2002) and the government accepted its recommendation that all listed companies publish quarterly reports for financial periods starting from 1 January 2003. The DASC was a private-sector-led consultative committee appointed by the Singapore Ministry of Finance in wake of the Asian financial crisis of 1997. One of the causes of the Asian financial crisis, identified by DASC, was insufficient disclosures by corporate entities. Although the DASC recognized that quarterly reports may not be prepared as diligently as annual reports, they felt that more frequent, periodic disclosures would enhance certainty and confidence in the market. However, due to the reservations of the smaller companies, the issue came under scrutiny again in the second half of 2002. After its formation in August 2002, the Council on Corporate Disclosure and Governance (CCDG), a regulatory body for setting accounting standards in Singapore, initiated a discussion on quarterly reporting and recommended that companies with a market capitalization of S\$20 million or below be exempted from reporting on a quarterly basis (Ministry of Finance Media Release, 2002). The limit was later raised to \$75 million (SGX, 2004).

In the debate leading up to the requirement for quarterly reporting being established, questions were raised about the usefulness of quarterly reports. Critics pointed to the reasons of the London Stock Exchange's (LSE) opposition to an EU proposal for mandatory quarterly reporting. The LSE felt that six-monthly reporting and continuous disclosure requirements were sufficient and that quarterly reporting would not add meaningfully to the disclosure process. Quarterly reports were also felt not to be equally useful for all companies. In the case of technology companies where business cycles were short, such reports were generally regarded as useful, but the case may not be the same for other companies such as banks and property developers whose business cycles are longer (The Business Times, 21 Aug 2002c). Also, local investors and analysts felt that quarterly reporting in its suggested format was not ideal as its bottom-line figures did not tell the whole story. It was felt that other announcements, not contained typically in financial statements, could be far more useful (The Straits Times, 22 Aug 2002).

In the United Kingdom, the Treasury, the Confederation of British Industry (CBI), the Association of British Insurers, and the European Savings Banks Groups have argued against having quarterly reporting. They have argued that the Enron and WorldCom scandals arose from the 'short-termism' that stems from quarterly reporting. If company executives, they felt, were put under pressure to show results every three months, they would be tempted to manipulate accounts (The Business Times, 21 August 2002c). Meanwhile, in the United Kingdom, Chartered Institute of Management Accountants (CIMA) warned that without the conclusion of enough management commentary on business outlook in quarterly reports, companies ran the risk of making short-term decisions to make the bottom-line numbers attractive to investors. This they felt would increase price volatility (The Standard, 26 Nov 2002). Similar concerns about increased speculation were voiced in Singapore. Critics were dismayed that Singapore had tilted in favor of traders in stocks rather than investors. (Dhanabalan, 2002). The opinion expressed was that quarterly reporting would increase the volatility of stock prices, as investors would react to the short-term information flow (The Business Times, 2 Nov 2002b). In this respect, it was also felt that management would report earnings more opportunistically, seizing upon the increased regularity of financial reporting to "massage" earnings figures to meet expectations or achieve targets upon which their bonuses and other performance-based pay are dependent (The Straits Times, 22 Aug 2002).

Furthermore, according to industry feedback, preparing the accounts for public dissemination every three months was a cost small companies could not afford. Fund managers and brokers believed that regular updates on company performance were more important for medium to large corporations and less so for small companies. But others argued that it was the small firms that lacked transparency and, thus, should be required to provide the market with more regular feedback (The Business Times, 13 Nov 2002a).

However, with approximately 12% of firms (66 out of 520 firms listed on the SGX main-board and SESDAQ) already opting to publish quarterly reports before the regulation came into effect, there were obvious supporters of quarterly reporting within the corporate sector. Therefore, there were reasons to believe that certain firms were inclined to adopt quarterly reporting on a voluntary basis.

This study is carried out to address the doubts over the usefulness of quarterly reports to investors. In particular, we seek to investigate the following research questions:¹

Benefits of quarterly reporting:

1. Do quarterly reporters have higher analyst following than semiannual reporters?
2. Does quarterly reporting enhance trading in stocks?
3. Does quarterly reporting increase earnings management?

Drawbacks of quarterly reporting:

4. Does quarterly reporting increase earnings management?
5. Does quarterly reporting increase stock price volatility?

Determinants of quarterly reporting:

6. What types of firms would voluntarily adopt quarterly reporting?

2.2. Contemporary online-reporting setting in Singapore

Online reporting is fairly common in Singapore. Internet-linked or online-reporting venues provide low-cost means of disseminating market-relevant corporate information on a continuous basis. They provide the stakeholders ease of access, low transaction costs of the information search, near-instantaneous availability of information, fair disclosure to all interested parties, and a wide reach (Debrecceny & Rahman, 2005). Singapore listed firms are required to make announcements of price-sensitive information in the Singapore Exchange (SGX) website through the MASNET (Monetary Authority of Singapore website) website. Stock trades by insiders, accounting information, and prospective information are the three most popular forms of information reported through this online system (Debrecceny & Rahman, 2005). We control for the influences of online reporting on the SGX website in answering the above questions on quarterly reporting.

¹ A similar but not identical list has been published by Corporate Governance Executive (2003) at www.cgfnus.edu.sg/Publications/CGE/cge_1_3.htm

Another form of online reporting that has also evolved in recent times is disclosure through company websites (Debreceeny, Gray, & Rahman, 2002). We do not include data from the corporate websites in our analyses as we feel that most price-sensitive information would be disclosed in the stock exchange website because of the SGX requirements. Also, stock exchange disclosures would be more credible as the SGX penalizes firms making misleading disclosures. Debreceeny and Rahman (2005) examine the types of disclosures in the announcements of 22 MSCI mid-cap companies of Singapore. They find that of the 1,514, 66.73% are about share transactions by insiders, 12.63% are about earnings and accounting (only 1.84% are about quarterly earnings), 12.74% are about prospective information and 7.28% are on corporate governance information.

Furthermore, apart from the online announcements, the SGX website is a “one-stop-shop” for other important corporate information including annual and interim financial reports. Therefore, we feel that there would be little additional price-sensitive information on the corporate websites.

3. Prior literature, hypotheses, and models

Corporate disclosure turns private information into public information (Easley & O'Hara, 2004), which reduces the information asymmetry between insiders and outsiders and between informed and uninformed outsiders (Brown, Hillegeist, & Lo, 2004; Leuz & Verrecchia, 2000). It is also understood that managers will make announcements or additional disclosures voluntarily when the benefits of disclosure exceed the associated costs (Chow & Wong-Boren, 1987; Dye, 1986). Dye (2001) and Verrecchia (2001) feel that there is no generally accepted categorization of disclosure studies. However, from an empirical disclosure literature perspective, we see two sets of disclosure studies, one set examining the effects of disclosure and the other set dealing with the determinants of disclosure.

Within the effects-of-disclosure category, there are studies that examine the effects of disclosure on earnings. They examine how disclosure may compete with or support accounting information, particularly earnings (e.g., Francis et al., 2002a; Francis, Schipper, & Vincent, 2002b). Within the effects-of-disclosure literature there also are studies that examine the effects of level of disclosure (e.g., Botosan, 1997). There are also those who examine the determinants of disclosure (Chow & Wong-Boren, 1987; Debreceeny & Rahman, 2005).

The questions that have risen in the quarterly-reporting debate relate mainly to the level of disclosure effects on market parameters and the determinants of disclosure. Therefore, we address our questions based on the literature in these two strands of research.

3.1. *Benefits of quarterly reporting*

Early research in quarterly reporting suggests that quarterly earnings are value relevant (Brown & Niederhoffer, 1968), and investors put equal emphasis on both quarterly and annual accounting earnings (May, 1971). Furthermore, Foster (1977) and Abdel-khalik and Espejo (1978) show that quarterly earnings help predict annual earnings. Recent research shows that while the value relevance of annual earnings is receding (Francis & Schipper, 1999; Lev & Zarowin, 1999), quarterly reporting has experienced an increase in value relevance over time (Landsman & Maydew, 2002).

We attempt to confirm the issue of relevance of quarterly reporting by answering our questions on the benefits of quarterly reporting identified in the earlier section.

3.1.1. Do quarterly reporters have higher analyst following than semiannual reporters?

Lang and Lundholm (1993) argue that if more timely information is available, then analyst coverage could become lower because there is less demand for alternative sources of information. Nagar, Nanda, and Wysocki (2003) and Skinner (2003) support this argument by explaining that analysts are an important part of the demand mechanism of corporate disclosure. However, Lang and Lundholm (1993) and Lang et al. (2002) find that when more timely information is available analyst coverage is higher. This they feel occurs because timely information enables analysts to better conduct their activities. Analysts, they contend, are information intermediaries who use corporate disclosures along with information from other sources to further inform the markets about corporate activities. Likewise, they are likely to be associated with firms that disclose more frequently, e.g., by way of quarterly reports. Therefore, we hypothesize that:

H1. The number of analysts following the firm is positively associated with quarterly reporting.²

Using the model below, we assess whether or not analyst following is associated with quarterly reporting (QR). QR is the experimental variable, and the remaining variables control for other influences that can also increase analyst following. NoA controls for online announcements, presumably the most frequent form of disclosures of most firms, especially after the introduction of online disclosures. ABSROE and PRFT control for the magnitude and direction of profitability, respectively. Analysts are likely to pay more attention to firms with large magnitudes of profit and loss and follow profitable firms more often. SIZE controls for many missing variables, e.g., corporate diversity and complexity, higher levels of activity, and economies of scale for disclosure. Large firms are known to disclose more (Botosan, 1997). IND_(t-1) controls for industry influences on analyst following. Finally, firms listing in the US would have more analysts following them because they are likely to have a wider investor base.

$$AF = \alpha + \beta_1 QR + \beta_2 NoA + \beta_3 ABSROE + \beta_4 PRFT + \beta_5 SIZE + \beta_6 USLST + \sum_{t=1}^9 d_t IND_t^c A \quad (\text{Model 1})$$

Where:

- AF Logarithm of number of analysts following the firm in 2001.
- QR Quarterly or semi-annual reporter (one for quarterly reporter and zero for semiannual reporter).
- NoA Logarithm of number of announcements by the firm on SGX website.
- ABSROE Logarithm of absolute value of return on assets for 2001.
- PRFT Sign of return on assets for 2001.
- SIZE Logarithm of 2001 end of year market value.
- USLST Listed in the United States or has ADR in the United States.

² We do not test for forecast accuracy and forecast dispersion as done by Lang and Lundholm (1996) because many Singapore firms are either followed by one analyst or have no analyst following

$IND_{(1-9)}$ Nine dichotomous dummies for identifying a firm's industry using United States NAICS Code.

3.1.2. Does quarterly reporting enhance trading in stocks?

Kim and Verrecchia (1991) identify volume change as a proxy for different belief revision of investors. Investors feel more certain about future outcomes of the firm's activities with higher levels of information (Leuz & Verrecchia, 2000). Cready and Hurtt (2002) show that liquidity of stocks is higher in the presence of higher amounts of disclosure with earnings announcements. Brown, Hillegeist, and Lo (2004) demonstrate that frequent and prompt release of material information in the form of conference calls can reduce the information asymmetry of firms. They explain that timely disclosures make investors aware of private information regarding future earnings of the firm. Such disclosures reduce the information asymmetry between uninformed and informed investors. They show that regular release of disclosures enhances the confidence of investors in the firm. Quarterly reporting being a more timely and regular form of reporting also can make traders more confident about their private valuations, encouraging them to trade more often using such valuations.

Also, because earnings-related information becomes more frequently available through quarterly reporting, the information in annual earnings is anticipated sooner and reflected in stock prices faster (Butler et al., 2005). This, in turn, enhances the turnover of shares of a firm. Butler et al. (2005) find higher liquidity levels for United States quarterly-earnings disclosers when quarterly earnings disclosure was voluntary in the United States. Accordingly, we hypothesize that:

H2. The liquidity of a firm's shares is positively associated with quarterly reporting.

Our investigation involves the model shown below. All the information variables, QR, AF, ABSROE, NoA, and AR, are likely to enhance liquidity. $IND_{(1-9)}$ controls influences such as industry risk and industry concentration. USLST controls for the extra liquidity resulting from being listed in a larger stock market, the United States market (Saudagaran & Biddle, 1995).

$$VOL = \alpha + \beta'_1 QR + \beta'_2 AF + \beta'_3 ABSROE + \beta'_4 PRFT + \beta'_5 NoA + \beta'_6 AR + \beta'_7 USLST + \sum_{l=1}^9 d_l IND_l \quad (\text{Model 2})$$

Where the additional variables are:

VOL The log of the ratio of total volume traded in 2001 to total outstanding stocks at the end of 2001.

AR Annual returns in 2001.

3.2. Drawbacks of quarterly reporting

3.2.1. Earnings manipulation

Lobo and Zhou (2001) find a negative association between disclosure level and earnings management using a sample of United States firms. An effective way for management to influence reported earnings subtly is to manipulate accounting policies relating to accruals. We adopt the definition of discretionary accruals of Kothari, Leone, and Wasley (2005) to measure earnings management. We first determine a firm's total accruals for the year as the difference

between operating cash flows and net income. The discretionary component of total accruals, which does not depend on changes in business activities and the external economic climate, but on the willful acts of management, is separated and identified using the following model advocated by Kothari et al. (2005):³

$$TA_{ax}/A_{ax} = a_0 + b_1 1/A_{ax} + b_2 \Delta REV_{ax}/A_{ax} + b_3 PPE_{ax}/A_{ax} + b_4 ROA_{ax} + \varepsilon_{ax}$$

Where:

TA_{ax} Total accruals for firm a in year x (Income before tax less cash flow from operations)

ΔREV_{ax} Revenues for firm a in year x less revenues for year $(x-1)$

PPE_{ax} Gross property, plant, and equipment for firm a in year x

A_{ax} Total assets for firm a in year x

ε_{ax} A residual term that captures discretionary accruals

The inclusion of ΔREV_{ax} and PPE_{ax} is to account for non-discretionary accruals of current assets and liabilities and the non-discretionary aspect of amortization and depreciation expenses that is dependent on the firm's investment in capital assets, respectively. The residual, i.e., ε_{ax} is an estimate of the discretionary accrual of year x for firm a .

Although literature predicts lower levels of earnings management for firms with higher levels of disclosure, the press in Singapore reported the concern that with more frequent disclosures under a quarterly reporting regime firms will focus on short-term earnings and engage in earnings management on a more frequent basis (The Business Times, 2 November, 2002b; The Business Times, 21 August 2002c). The belief here is that as firms report quarterly they will have more opportunities to make changes in their accruals such as receivables, payables, and inventory. To test this notion, we hypothesize that:

H3. Discretionary accruals are positively associated with quarterly reporting.

Following prior studies (e.g., Kim, Chung, & Firth, 2003), we use the following Fama–McBeth⁴ approach for testing this hypothesis:

$$DA = a + b'_1 QR + b'_2 AF + b'_3 NoA + b'_4 USLST + b'_5 SIZE + b'_6 AIP + b'_7 LEV + \sum_{l=1}^9 d'_l IND_l + \varepsilon_{DA} \quad (\text{Model 3})$$

Where the additional variables are:

DA Discretionary Accruals for 2001.

AIP Log of the ratio of book value of the firm's assets to market value of the firm's assets in 2001

LEV Log of total debt to total equity in 2001

³ We could not use the modified-Jones model as it requires data on receivables, which we could not acquire for a large part of our sample.

⁴ The use of the Fama–McBeth approach implies the use of three factors that contribute to firm performance as control variables. Following in Kim et al. (2003) and Kothari et al. (2005), we control for the common performance-related variables: size, growth (through AIP), and leverage. These variables, being performance-related variables, can affect discretionary accruals.

We introduce USLST to control for the influence of United States listing. We expect the level of DA to be less for United States listed firms due to the additional scrutiny in the United States market. $IND_{(t-9)}$ is introduced as a control because the different industry cycles may create different levels of DA_{it} . Also, the other information variables, AF and NoA, allow for additional scrutiny, which would also reduce DA. Therefore, we control our model for these variables as well.

3.2.2. Stock price volatility

Another concern of the critics of quarterly reporting is that this more frequent form of earnings reporting would increase price volatility of stocks. This presumably would occur due to the short-term focus on earnings of the investors. The investors would engage in speculative trading rather than focus on long-term performance (The Business Times, 2 November 2002b; The Business Times, 21 August 2002c). Contrary to this view, the disclosure literature suggests that more frequent disclosures reduce price fluctuations as more information would reduce information asymmetry (Brown et al., 2004; Welker, 1995). However, much of such literature is based on the United States market, which is more transparent than the Singapore market. Additional sources of information in Singapore are fewer, making it more likely for the investors to rely on reported-earnings numbers. Likewise, for the Singapore market we hypothesize that:

H4. The stock returns volatility of quarterly reporters is higher than that of the semiannual reporters.

We use the following model to test this hypothesis:

$$\text{STDRET} = \delta + \delta_1 \text{QR} + \delta_2 \text{AF} + \delta_3 \text{VOL} + \delta_4 \text{ABSROE} + \delta_5 \text{PRFT} + \delta_6 \text{NoA} + \delta \cdot \text{USLST} + \sum_{l=1}^9 d_l \text{IND}_l + e_{511} \quad (\text{Model 4})$$

Where the additional variables is:

STDRET Standard deviation of absolute monthly returns. Absolute value of monthly returns is used because QR can cause both upward and downward price movements depending on the sign of the earnings.

Since price volatility can arise from the level of trading, we control for VOL. We control for NoA and AF, as additional sources of information. We also control for ABSROE, PRFT, and USLST because better-performing firms and firms receiving the scrutiny of the United States exchanges would have lower risk, and, therefore, lower price volatility. Industries have different levels of risk, and we control such risks by introducing the dummies $IND_{(t-9)}$.

3.3 Determinants of quarterly reporting (What types of firms would voluntarily adopt quarterly reporting?)

To answer the question “what types of firms would voluntarily adopt quarterly reporting”, we identify the firm-specific factors that are associated with reporting frequency. Leftwich et al. (1981) explore the association between firm characteristics and frequency of reporting. Their findings indicate that the debt–equity ratios of semiannual reporters in the United States are significantly higher than the corresponding ratios for the other reporting frequencies and

assets in place, a proxy for information asymmetry. Butler et al. (2005) carry out a multivariate analysis of the determinants of quarterly reporting. The results confirm the hypotheses that larger firms in concentrated industries with more asymmetrically informed investors, higher agency costs, and better performance tend to report more frequently.

Following Butler et al. (2005), we identify five factors that are likely to affect reporting frequency of companies: information asymmetry, agency costs, firm size, proprietary disclosure costs, and firm performance. Further discussion of each variable and their hypotheses are presented below.

Generally, firms with greater future-investment opportunities benefit more from frequent reporting as a firm with greater investment opportunities would have higher levels of information asymmetry with investors. These firms are also high-growth firms. We use assets-in-place to determine the investment-opportunity set of firms. High assets-in-place represents low information asymmetry and low growth prospects. Following Butler et al. (2005), we define assets-in-place as a ratio of book value of the firm's assets to market value of the firm's assets. We hypothesize that:

H5. Quarterly reporting is negatively related to assets-in-place.

Agency costs are present due to the existence of information asymmetry between the principal (shareholders) and the agent (management). To mitigate such costs, there is a need for more frequent reporting (Butler et al., 2005). Highly leveraged firms with more debt financing have higher agency costs and so they have a greater demand for external financial reporting as a form of monitoring. Thus, we hypothesize that:

H6. Quarterly reporting is positively associated with debt-equity ratio.

Firm size is related to the level of information asymmetry in firms (Botosan, 1997; Butler et al., 2005). Large firms have higher political cost associated with non-disclosure and are in a better position to expend additional funds on reporting. Consequently, we hypothesize that:

H7. Quarterly reporting is positively associated with firm size.

Disclosure of company information whether voluntarily or due to regulation can be a potential threat to the company's viability. Competitors can make use of such information and gain access to the firm's competitive advantage. Disclosure of company information thus entails high proprietary disclosure costs, especially in concentrated industries where there are a greater number of market contenders. In such a case, firms are more likely to protect their market position by disclosing less frequently (Butler et al., 2005). To measure proprietary costs, the four-firm concentration ratio (CR4) is adopted. This is defined as the sum of the market shares of the four largest firms in the industry. Using S to denote total sales for firms in a given Primary US NAICS industry, and s_i to represent the sales of the i th largest firm in the industry,

$$CR4 = \frac{\sum_{i=1}^4 s_i}{S}$$

We, therefore, hypothesize:

H8. Quarterly reporting is negatively associated with proprietary costs of disclosure.

Generally, most researchers believe that the frequency of disclosure is closely related to firm performance. There is also support from recent empirical studies that better performing firms, because they are more likely to exceed disclosure-cost thresholds, disclose at higher levels (Healy & Palepu, 2001; Butler et al., 2005). Therefore, we hypothesize that:

H9. Quarterly reporting is positively related to firm performance.

Performance is measured by return on equity as defined earlier. We use absolute value of ROE (ABSROE) and a profit dummy (PRFT) to represent performance. Absolute value of ROE is used because the dependent variable is a disclosure variable that can be affected by both large negative earnings and large positive earnings. Prior studies suggest that the relation between disclosure and performance may not be linear. Skinner (1994) demonstrates that the level of disclosure increases with an increase in losses because in such situations firms try to reduce litigations from investors. Conversely, Miller (2002) shows that firms with increasing profits increase discretionary disclosures.

Based on hypotheses 5 to 9, we are able to come up with the model below to test the determinants of quarterly reporting. We use listing in the United States exchanges and having ADR as a control variable. Companies that list in the United States have to prepare quarterly reports. We also use industry dummies to control for any remaining industry influences such as production or seasonal cycles that may encourage firms to disclose earnings on a quarterly basis.

$$\begin{aligned} QR = & \gamma + \gamma_1 AIP + \gamma_2 LEV + \gamma_3 CR4 + \gamma_4 SIZE + \gamma_5 ABSROE \\ & + \gamma_6 PRFT + \gamma_7 USLST + \sum_{I=1}^9 Y_I IND_I + e_{QR} \end{aligned} \quad (\text{Model 5})$$

Where the additional variables is:

CR4 Ratio of the revenue of the four largest firms in an industry to total revenue of the industry in 2001

This model is estimated using binary logistic regression. Binary logistic regression is similar to linear regression, but it is suited to models where the dependent variable is dichotomous. In Model 5, QR is dichotomous.

4. Sample selection, data measurement and descriptives

4.1. Sample selection and data

Our base sample has 520 firms from one year, 2001, that were listed on the main-board of SGX and SESDAQ and whose data were generally available in the Bloomberg database. However, our sample size for each model varies, depending on the availability of data for the specific variables of the model.

The data for each variable were procured in the following manner:

QR Firms were identified as quarterly reporters and semiannual reporters by observing their reporting pattern in the SGX website in 2001. Firms making quarterly reports were identified as quarterly reporters. All others were regarded as semiannual reporters.

	All listed firms in Singapore in 2001 were required to report on a semiannual basis.
AIP	Book value and market value for AIP were procured from Bloomberg.
LEV	Total debt and total equity were procured from Bloomberg.
CR4	The revenue data for CR4 were procured from Bloomberg.
SIZE	Market value data were procured from Bloomberg.
ROE	The return-on-assets data were procured from Bloomberg.
ABSROE	The absolute value of ROE for 2001.
PRFT	Sign of return on assets for 2001, 1 = Profit and 0 = Loss.
USLST	Listing information was procured from each company's annual report.
AF	Analyst followings were analyst numbers on each company's Yahoo Finance research report.
NoA	The number of announcements data were procured from the SGX website
AR	Annual returns were procured from Bloomberg.
VOL	The total volume traded and total outstanding stock data for VOL were procured from Bloomberg.
DA	The data for the computation of Discretionary Accruals for the Kothari et al. (2005) model were procured from Bloomberg.
STDRET	Standard deviation of absolute monthly returns were computed from the monthly returns data procured from Bloomberg
IND ₍₁₋₉₎	Nine dichotomous variables, each representing an industry in the following manner: 1 – industry membership; 0 – other industries. Industry identification was done using US NAICS Code. The data for this code were procured from OSIRIS. The industry names are listed in Table 1, Panel B.
TA _{it}	For total accruals income before tax and cash flow from operations for firm <i>a</i> in year <i>x</i> were collected from Bloomberg.
ΔREV_{it}	Revenues for firm <i>a</i> in year <i>x</i> were procured from Bloomberg
PPE _{it}	Gross property, plant, and equipment for firm <i>a</i> in year <i>x</i> data were procured from Bloomberg
A _{it}	Total assets for firm <i>a</i> in year <i>x</i> were procured from Bloomberg

If the amounts for any of the above items were in currencies other than the Singapore dollar then the amounts were converted using the average exchange rates for 2001 provided by the Economic Survey of Singapore (First Quarter 2002) of Statistics Singapore.

4.2. Descriptives

Table 1 panel A illustrates the descriptive statistics for the variables of all the models. Because of uneven data availability, the sample size (*N*) for the variables varied between 292 and 497 firms. Some variables were skewed and had kurtosis. The measures for these variables were transformed into logarithms. The useable number of cases (*N*) for each model is stated at the end of the respective tables for the models.

Panel B of Table 1 shows that 66 (13.28%) out of the 497 firms for which reporting information was available were quarterly reporters. The highest number of firms voluntarily adopting quarterly reporting in any one industry was in the Technology industry (29.4% of the firms). The highest mean number of announcements was in the Diversified industry (41

Table 1
Descriptive Statistics

Panel A: Dependent and independent variables

Descriptive Statistics	N	Mean	Std Dev	1%	5%	25%	50%	75%	95%	99%
QR	497	0.133	0.340	0.000	0.000	0.000	0.000	0.000	1.000	1.000
AIP	397	1.070	0.405	0.243	0.420	0.806	1.043	1.280	1.815	2.327
LEV	397	0.456	0.235	0.028	0.081	0.264	0.453	0.647	0.834	0.916
CR4	397	0.593	0.173	0.264	0.398	0.398	0.604	0.718	0.892	0.998
SIZE	397	1.920	0.686	0.822	1.040	1.435	1.777	2.274	3.312	4.222
ROE	397	-2.023	31.080	-147.383	-48.928	-6.435	-3.400	-11.515	-27.041	-47.632
ABSROE	397	0.940	0.543	-0.538	0.055	0.589	1.005	1.335	1.728	2.168
PRFT	397	0.665	0.473	0.000	0.000	0.000	1.000	1.000	1.000	1.000
USLST	497	0.050	0.219	0.000	0.000	0.000	0.000	0.000	1.000	1.000
AF	494	1.075	0.137	1.000	1.000	1.000	1.000	1.079	1.447	1.544
NoA	489	1.499	0.242	1.075	1.204	1.322	1.447	1.613	1.961	2.363
AR	461	0.011	0.049	0.000	0.000	0.001	0.003	0.008	0.041	0.117
VOL	443	1.183	0.793	0.755	0.095	0.676	1.172	1.782	2.399	2.815
STDRET	262	1.146	0.229	0.670	0.796	1.004	1.121	1.281	1.281	1.817
DA	276	0.000	0.993	-2.766	-0.166	-0.025	0.010	0.054	1.012	1.245

Panel B: Industry-wise distribution of quarterly reporters in 2001

Industry (IND ₍₁₋₉₎)	Total No. of Companies	Quarterly reporters	% of Quarterly reporters	Mean No. of Announcements	Mean Analysts Followings
1. Basic materials	16	0	0.0	35.3	0.7
2. Communications	36	6	16.7	35.1	4.2
3. Consumer, cyclical	87	12	13.8	22.0	1.0
4. Consumer, non-cyclical	61	7	11.5	23.2	2.8
5. Diversified	12	0	0.0	41.0	4.5
6. Energy and utilities	2	0	0.0	23.5	0.0
7. Financial	59	14	23.7	38.0	5.9
8. Industrial	190	17	8.9	27.4	1.9
9. Technology	34	10	29.4	31.4	4.2
Total	497	66	13.3	28.6	2.7

QR = Firms were identified as quarterly reporters and semiannual reporters by identifying their reporting pattern in the SGX website in 2001. Any firm making quarterly reports was identified as a quarterly reporter. Otherwise it was identified as a semi-annual reporter, as all firms are required to report on a semiannual basis.

AIP = Book value by market value.

LEV = Total debt by total equity.

CR4 = Industry concentration.

SIZE = The log of market value.

ROE = The log of return on assets.

ABSROE = The log of absolute value of ROE for 2001.

PRFT = Sign of return on assets for 2001, one = Profit and zero = Loss.

JSLST = Listing information was procured from each company's annual report.

AF = The log of analysts' following in Yahoo Finance research reports.

NoA = The log of number of announcements in SGX website.

AR = Annual returns in 2001.

VOL = Total volume traded divided by total outstanding stock.

DA = Discretionary accruals.

TDRET = Standard deviation of absolute monthly returns.

IND₍₁₋₉₎ = Industry identification using United States NAICS Code.

announcements) and the highest mean analyst following was in the Financial industry (5.9 analyst followings). There were large variations between firms (panel A, Table 1) and between industries (panel B, Table 1) for both the number of announcements and analyst followings.

4.3. Bivariate analysis

Table 2 provides bivariate correlation statistics for the variables. It shows that QR is positively correlated with SIZE, USLST, AF, NoA and STD_RET ($p < 0.01$) and is negatively correlated with AIP ($p < .05$). High bivariate correlations also exist between the independent variables, suggesting multicollinearity problems for the multivariate analyses. However, the VIFs for each of the independent variables, as reported in the tables for multivariate analyses, are well below the statistically unacceptable level of 10. Therefore, none of our multivariate tests are significantly affected by multicollinearity between the independent variables.

5. Multivariate tests and results

5.1. Benefits of quarterly reporting

5.1.1. Do quarterly reporters have higher analyst following than semiannual reporters?

Multivariate results stated in Table 3 for Model 1 suggest that AF is positively associated with QR ($p < 0.05$). The results support H1. However, the positive association for AF and NoA ($p < 0.01$) exceeds that between AF and QR. AF is also positively associated with the magnitude of earnings (ABSROE), SIZE and USLST ($p < 0.01$), suggesting that online announcement is a strong competitor for quarterly reporting in the area of forms of frequent reporting.

1. Does quarterly reporting enhance trading in stocks?

Table 4 provides the results for estimates of Model 2. The results do not support H3 as QR is not significantly associated with VOL. However, both NoA and AF have significant positive association with VOL ($p < 0.01$). This clearly suggests that information variables that allow for more frequent monitoring of firms than quarterly reporting increase liquidity in stocks more than quarterly reporting does. Critics of quarterly reporting have argued that the practice of disclosing vital events and developments instantaneously by corporations using online announcements diminishes the relevance of interim reports (Carnegie, 2004; The Business Times, 12 November 2005). In addition, other information variables, ABSROE, and AR are also positively associated with VOL ($p < 0.01$). From these results we can infer that other forms of information are more associated with liquidity than quarterly reporting.

To examine how quarterly reporting affects intra-period timeliness of earnings, we compute 15-month cumulative stock returns of the quarterly reporters and the control group, semi annual reporters, respectively. To compute month cumulative stock returns, the absolute value of the returns (MthRet) was taken because the impact of quarterly reporting is observed through the movement in share prices regardless of whether the change is a positive or adverse adjustment. We compute MthRet at the end of each month i (i – one to 15) as a percentage of the 15-month total returns (TotRet). We take the 15-month total returns because the effects of the final quarter for the quarterly reporters would continue for three months from the end of the year. The year from which the sample was taken had the

Table 2
Pearson Correlation

QR	AIP	LEV	CR4	SIZE	ABSROE	PRFT	USLST	AF	NoA	VOL	STDRET	DA
QR	1											
AIP	101*	-0.008	-0.009	193**	0.005	0.017	154**	243**	155**	0.04	111*	152**
LEV	1	378**	0.046	170**	463**	0.041	0.021	264**	100*	414**	161**	0.008
CR4	0.008	1	-0.049	125**	089*	273**	0.032	0.068	0.017	192**	0.089	0.082
SIZE	-0.009	0.046	1	153**	0.002	0.03*	0.059	0.067	0.004	107*	0.065	0.025
ABSROE	193**	170**	153**	1	0.046	240**	320**	742**	464**	119**	0.007	108*
PRFT	-0.005	089*	0.002	0.046	1	275**	0.013	121**	110*	25**	127*	174**
USLST	0.017	273**	0.03*	240**	275**	1	0.016	151**	0.054	0.009	0.049	0.095
AF	154**	0.021	0.059	320**	0.013	0.016	1	370**	238**	109*	111*	0.038
NoA	243**	0.068	0.067	742**	121**	151**	370**	1	40**	238**	111*	13**
VOL	155**	0.017	0.004	464**	110*	0.054	238**	40**	1	222*	127*	0.003
STDRET	0.04	192**	107*	119**	257**	0.009	109*	238**	222**	1	219**	0.051
DA	111*	0.089	0.065	0.007	127*	0.049	111*	111*	12**	219**	1	0.011
	152**	0.008	0.025	108*	174**	0.095	0.038	13**	0.003	0.051	0.011	1

* $p < 0.05$ ** $p < 0.01$

Table 3

Multivariate test for determinants of analyst following (Model 1)

Dependent Variable: AF						
Coefficients	Beta	Std Beta	<i>t</i>	Sig.	Tolerance	VIF
(Constant)	0.667		21.495	0.000		
QR	0.025	0.062	1.879	0.030	0.903	1.107
NoA	0.083	0.143	3.815	0.000	0.704	1.421
ABSROE	0.031	0.122	3.523	0.000	0.826	1.210
PRFT	0.010	0.033	0.951	0.081	0.828	1.208
SIZE	0.129	0.639	15.432	0.000	0.580	1.723
USLST	0.060	0.101	2.968	0.001	0.855	1.170
Basic materials	-0.014	-0.019	-0.594	0.553	0.927	1.079
Communications	0.019	0.034	1.013	0.312	0.863	1.159
Consumer, cyclical	-0.027	-0.076	-2.159	0.031	0.805	1.241
Consumer, non-cyclical	0.001	0.002	0.047	0.963	0.831	1.204
Diversified	-0.048	-0.052	-1.578	0.115	0.913	1.096
Energy and utilities	-0.049	0.025	-0.789	0.431	0.984	1.016
Financial	-0.015	-0.034	-0.902	0.368	0.712	1.405
Technology	0.002	0.004	0.118	0.906	0.858	1.165
<i>F</i> statistic	44.913					
<i>p</i>	0.000					
Adj <i>R</i> ²	0.611					
<i>N</i>	382					

Note: One-tailed results are reported for QR, NoA, ABSROE, PRFT, SIZE, and USLST.

Table 4

Multivariate test for liquidity effects of quarterly reporting (Model 2)

Dependent Variable: VOL						
Coefficients	Beta	Std Beta	<i>T</i>	Sig.	Tolerance	VIF
(Constant)	-0.710		-2.299	0.022		
QR	-0.092	-0.040	-0.861	0.195	0.892	1.121
AF	0.871	0.160	2.802	0.003	0.601	1.665
ABSROE	0.234	0.168	3.398	0.001	0.803	1.246
PRFT	0.079	0.050	1.028	0.153	0.847	1.181
NoA	0.472	0.151	2.835	0.003	0.690	1.449
AR	0.039	0.156	3.463	0.001	0.968	1.033
USLST	0.167	0.052	1.074	0.142	0.831	1.203
Basic materials	-0.182	-0.048	-1.040	0.299	0.926	1.080
Communications	0.329	0.113	2.363	0.019	0.861	1.162
Consumer, cyclical	-0.263	-0.137	-2.756	0.006	0.798	1.253
Consumer, non-cyclical	-0.153	-0.065	-1.339	0.182	0.840	1.190
Diversified	0.572	-0.114	-2.485	0.013	0.931	1.074
Energy and utilities	0.219	0.021	0.464	0.643	0.982	1.019
Financial	-0.349	-0.145	-2.883	0.004	0.776	1.288
Technology	0.439	0.148	3.105	0.002	0.864	1.158
<i>F</i> statistic	9.129					
<i>p</i>	0.000					
Adj <i>R</i> ²	0.240					
<i>N</i>	387					

Note: One-tailed results are reported for QR, AF, ABSROE, PRFT, NoA, AR, and USLST.

annual (fourth quarter) announcement deadline three months from the year-end closing. The plotted percentage of the 15-month total returns for every month t is:

$$y_t = \frac{\text{Cumulative monthly return}_t}{\text{Total return}}$$

To observe the timeliness of quarterly reporting we examine how quickly the monthly returns as a percentage of the 15-month total returns were earned over this 15-month period. We took a sample of the 62 SGX-listed firms in 2001: 31 of them being the experimental sample of quarterly reporters and 31 a control group of industry and size-matched semiannual reporters. Because we wanted to compare their pre and post quarterly reporting effects on returns of the experimental group, we had a strict definition for the experimental group. This group had to have quarterly reports in 2001 and but not in the prior year. The 15-month stock returns of the experimental group were calculated for both 2000 and 2001 fiscal years.⁵

The group of semiannual reporters used for comparison purposes was found using OSIRIS, which facilitated search by company grouping by industry and by size. The proxies for industry were the US NAICS codes, while that for size were the amount of total assets and turnover.

The respective average cumulative monthly returns (y_t) for the quarterly reporters before and after adopting quarterly reporting and the control sample of semiannual reporters are plotted in Fig. 1. It reflects the speed at which earnings information is reflected in share prices. The continuous line represents the y_t plots of the quarterly reporters, the long-dashed line is the y_t plot of quarterly reporters in the year before their adoption of quarterly reporting, and the small dashed line is for y_t of the semiannual reporters. We find that although the quarterly reporters' y_t exceeds the semiannual reporters, and pre-quarterly y_t , for most months of the 15-month span the differences are visible only between the fifth and the tenth months. This could be because the market starts to make predictions of annual earnings in the latter half of the year, and quarterly reporting assists investors to make such predictions.

These findings are consistent with the findings in Butler et al. (2005) for United States firms for the period 1950–73. Butler et al. (2005) find greater earnings timeliness for quarterly reporters after they started releasing their quarterly reports voluntarily. The United States study classifies quarterly reporters as voluntary and mandatory reporters. After increasing their frequency, the voluntary reporters displayed significant improvements in timeliness while the mandatory reporters, who did so as a response to reporting requirements imposed by the SEC in 1970, displayed limited improvement.

Butler et al. (2005) use a permutation test to calculate the area under the curve in the graphs. A test statistic which represents the differences between the returns of high- and low-frequency reporters is computed. We use the independent sample t -test to compare the difference between the average cumulative returns of quarterly reporters and semiannual reporters for each month, and between the average cumulative returns of quarterly reporters before and after they start issuing quarterly reports for each month.

⁵ For instance, Amtek Engineering Ltd. has a fiscal year end on August 2001. As such, the pre-frequency increase 15-month period would be from May 2000 to August 2001 and the post-frequency increase 15-month period would be from August 2001 to November 2002.

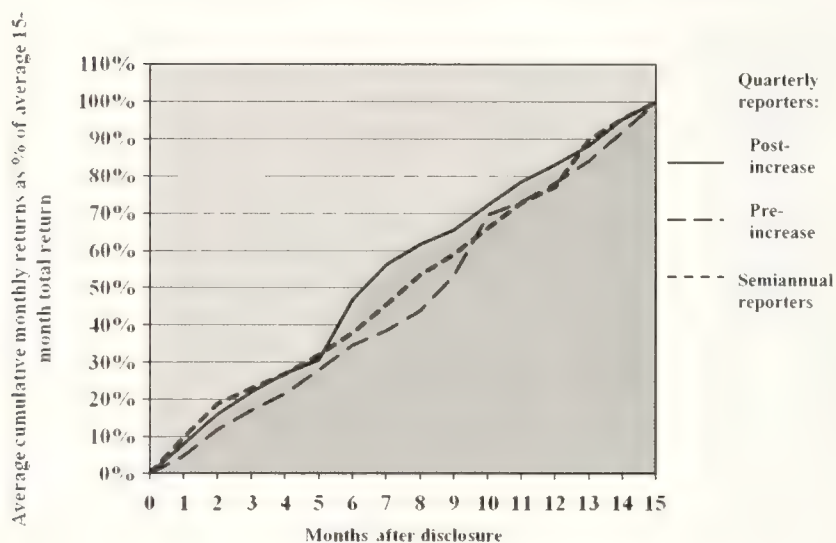


Fig. 1. Cumulative monthly return timeliness.

The comparison between quarterly reporters and semiannual reporters (Table 5) shows that the average cumulative monthly returns of quarterly reporters is greater than those of semiannual reporters throughout the 15-month period. However, only results for the first and third months are significantly different at the 10% level for the two groups.

As for the comparison of quarterly reporters' pre- and post-adoption of quarterly reports, the results in Table 6 suggest that the rates at which earnings were impounded into monthly returns are not significantly different between the two periods. Nevertheless, the means of

Table 5
Independent sample *t*-tests (quarterly vs. semiannual)

Month	<i>t</i> (2-tailed)	<i>df</i>	Sig.	Mean difference
First	0.947	57	0.348	0.107
Second	0.536	57	0.594	0.048
Third	0.456	57	0.650	0.140
Fourth	0.402	57	0.689	0.064
Fifth	0.211	57	0.834	0.060
Sixth	0.447	57	0.657	0.389
Seventh	0.517	57	0.607	0.235
Eighth	0.509	57	0.613	0.400
Ninth	0.329	57	0.743	0.060
Tenth	0.073	57	0.942	0.067
Eleventh	0.116	57	0.908	0.145
Twelfth	0.100	57	0.920	0.048
Thirteenth	0.074	57	0.941	0.104
Fourteenth	0.057	57	0.955	0.022
Fifteenth	0.016	57	0.987	0.015

Table 6
Independent sample *t*-tests (pre- vs. post-frequency increase)

Month	<i>T</i> (2-tailed)	<i>dt</i>	Sig	Mean difference
First	1.880	33.276	0.069	0.164
Second	1.495	30.527	0.145	0.170
Third	1.583	29.956	0.094	0.150
Fourth	1.548	29.685	0.132	0.125
Fifth	1.556	29.851	0.130	0.068
Sixth	1.333	29.300	0.193	0.467
Seventh	1.286	29.271	0.209	0.224
Eighth	1.342	29.372	0.190	0.096
Ninth	1.366	29.383	0.182	0.071
Tenth	1.356	29.368	0.185	0.137
Eleventh	1.382	29.390	0.178	0.139
Thirteenth	1.350	29.597	0.187	0.033
Fourteenth	1.368	29.564	0.182	0.173
Fifteenth	1.373	29.543	0.180	0.104

the cumulative monthly returns of quarterly reporters' post-quarterly reporting period are consistently greater than those of the pre-quarterly reporting period.

We also conduct some exploratory tests of the influence of quarterly reporting and other competing sources of information on the month-by-month turnover of the 62-firms sample used in Fig. 1. The plots for these comparisons are in Figs. 2, 3 and 4. In this regard, we find that for all three information sources for the investor—quarterly reporting, online corporate announcements, and analyst following—the volume of shares traded is higher for most months for those having quarterly reporting, above the median number of online announcements and firms with analyst following.

5.2. Drawbacks of quarterly reporting

5.2.1. Earnings manipulation

Table 7 shows the results of Model 3 estimates. The results contradict H3 as QR is not significantly associated with DA. However, DA is significantly negatively

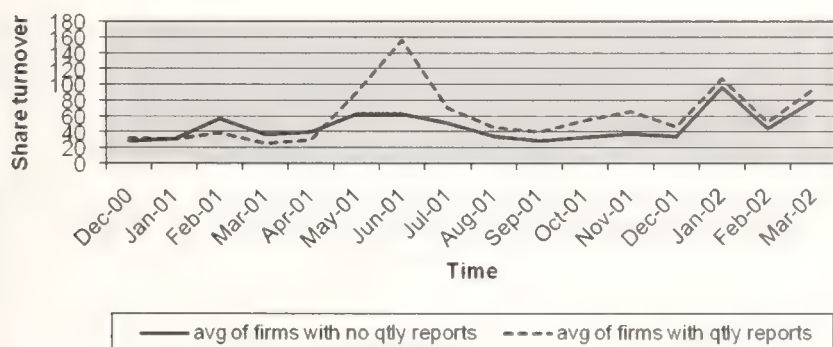


Fig. 2. Quarterly reporting and volume.

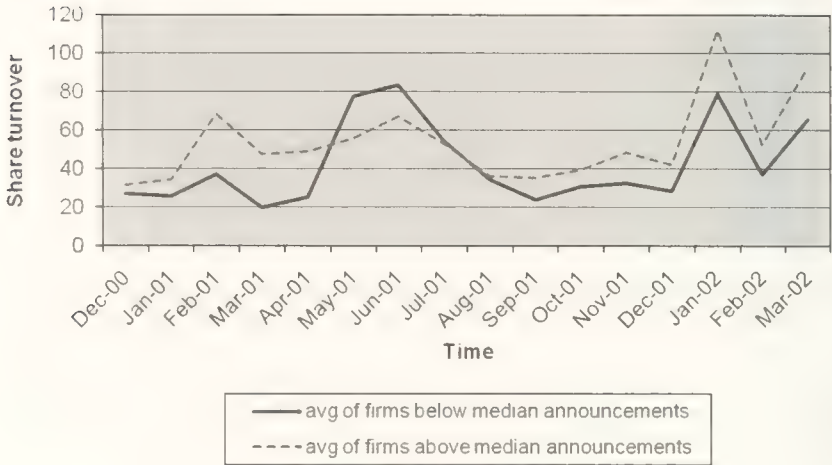


Fig. 3. Online announcements and volume.

associated with AF ($p < 0.01$) and NoA ($p < 0.05$). Likewise, we infer that discretionary accruals are not significantly associated with more frequent periodic reporting such as quarterly reporting, but are lower when there is greater scrutiny of analyst monitoring and when a firm puts its results under greater scrutiny through more frequent online disclosures of material events. Alternatively, since DA was computed on an annualized basis, one could argue that quarterly reporters may be managing their earnings on a quarterly basis rather than on an annual basis. However, this could be said about semiannual reporters as well, as they may resort to earnings management on a semiannual basis. We could not test these possibilities because of lack of availability of detailed quarterly-accounting data for quarterly reporters and semi annual accounting data for semiannual reporters.

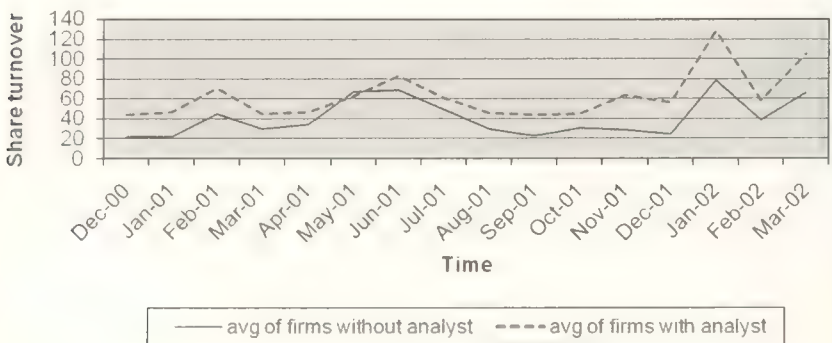


Fig. 4. Analyst following and volume.

Table 7
Multivariate test for earnings management (Model 3)

Dependent Variable: DA						
Coefficients	Beta	Std Beta	<i>t</i>	Sig.	Tolerance	VIF
(Constant)	1.970		3.365	0.001		
QR	−0.253	−0.091	−1.578	0.058	0.858	1.165
AF	−1.713	−0.265	−2.923	0.002	0.344	2.907
NoA	−0.448	−0.113	−1.714	0.044	0.650	1.539
USLST	0.368	0.099	1.673	0.048	0.805	1.242
SIZE	0.210	0.146	1.573	0.059	0.328	3.051
AIP	0.412	0.169	2.670	0.004	0.709	1.410
LEV	−0.597	−0.141	−2.319	0.011	0.764	1.309
Basic materials	0.285	0.051	0.932	0.352	0.930	1.075
Communications	−0.733	−0.184	−3.213	0.001	0.864	1.157
Consumer, cyclical	0.123	0.049	0.817	0.415	0.788	1.269
Consumer, non-cyclical	−0.007	−0.002	−0.035	0.972	0.808	1.238
Diversified	−0.090	−0.014	−0.259	0.796	0.913	1.096
Financial	0.592	0.202	3.148	0.002	0.683	1.464
Technology	−0.672	−0.177	−3.000	0.003	0.813	1.230
<i>F</i> statistic	6.840					
<i>P</i>	0.000					
Adj <i>R</i> ²	0.231					
<i>N</i>	272					

Note: One-tailed results are reported for QR, AF, NoA, and USLST, SIZE, AIP, LEV.

5.2.2. Stock price volatility

The test results for Model 4 are shown in Table 8. The table shows a significant association between STDRET and QR ($p < .05$). This finding supports H4.⁶

5.2.2.1. Determinants of quarterly reporting (Why do firms voluntarily adopt the quarterly form of reporting?). Table 9 provides the multivariate test results for determinants of quarterly reporting based on Model 5. The Cox and Snell R Square is 0.089 and the Nagelkerke R Square is 0.162 of the binary logistics regression. The variables that are significantly associated with QR are AIP ($p < 0.05$), SIZE ($p < 0.01$) and Technology ($p < 0.01$). These results lend partial support to the findings in Butler et al. (2005). The results for Technology indicates that firms in that industry disclose their financial information more frequently. In the US context, Sengupta (2004) finds that technology firms have the least delays in reporting their quarterly earnings. He explains that high-risk industries have more litigation risk, and, therefore, they disclosed more promptly. On the whole, results are significant for AIP, SIZE, and Technology. Therefore, we construe that firms with high growth prospects, larger size, and technology orientation are likely to use quarterly reporting, even if quarterly reporting is not mandated by the regulators.

⁶ Following United States studies, we conduct an additional test (results not reported) to see whether or not information asymmetry (bid-ask spread) is negatively associated with QR, and find that there is no significant association between the two variables.

Table 8

Multivariate test for price volatility and quarterly reporting (Model 4)

Dependent Variable: STDRET

Coefficients	Beta	Std Beta	<i>t</i>	Sig.	Tolerance	VIF
(Constant)	1.079		8.702	0.000		
QR	0.085	0.118	1.674	0.048	0.819	1.222
AF	−0.064	−0.045	−0.494	0.311	0.500	2.002
VOL	0.075	0.234	3.007	0.001	0.673	1.485
ABSROE	0.037	0.089	1.196	0.126	0.730	1.370
PRFT	0.046	0.097	1.390	0.083	0.829	1.206
NoA	0.000	0.000	−0.004	0.488	0.584	1.713
USLST	0.060	0.077	1.073	0.142	0.794	1.259
Basic materials	0.075	0.059	0.890	0.374	0.928	1.078
Communications	−0.048	−0.048	−0.688	0.492	0.847	1.181
Consumer, cyclical	−0.011	−0.019	−0.256	0.798	0.759	1.318
Consumer, non-cyclical	−0.041	−0.056	−0.786	0.433	0.811	1.233
Diversified	−0.053	−0.039	−0.585	0.559	0.911	1.098
Energy and utilities ^a					0.000	
Financial	−0.002	−0.003	−0.042	0.967	0.716	1.396
Technology	−0.035	−0.033	−0.471	0.638	0.832	1.202
<i>F</i> statistic	1.805					
<i>P</i>	0.039					
Adj <i>R</i> ²	0.046					
<i>N</i>	235					

^a The variable was dropped because its tolerance was equal to zero.

Note: One-tailed results are reported for QR, AF, VOL, ABSROE, PRFT, NoA, and USLST.

A reason for LEV not being positively associated with QR could be that most Singapore firms only seek debt from banks and, thus, have private debts. Private debt of this nature does not necessitate the use of voluntary public disclosures. Butler et al. (2005) find a positive association between leverage and quarterly reporting for the likely reason that in the United States of America firms rely on both private and public debts. Butler et al. (2005) is based on United States firms.

6. Conclusions

Based on five research questions arising from a debate on quarterly reporting in Singapore, we examine the pros and cons of quarterly reporting and identify firm-specific features that are associated with quarterly reporting. The disclosure environment in which we conduct the research is voluntary with respect to quarterly reporting and reasonably voluntary with respect to online reporting of corporate announcements. We infer from our findings that quarterly reporters have higher analyst following, but at the same time quarterly reporting is also associated with high price volatility. Additionally, results show that if left to their own discretion, firms with high growth prospects, larger size, and in the technology industry, (presumably high-risk companies), are likely to disclose earnings on a quarterly basis. We also find that online reporting is more positively associated with analyst following than quarterly reporting, and is also positively associated with liquidity.

Table 9
Multivariate test for determinants of quarterly reporting (Model 5)

	B	S.E.	Wald	df	Sig.	Exp(B)
AIP	−1.163	0.598	3.782	1.000	0.026	0.313
LEV	1.208	0.818	2.182	1.000	0.070	3.347
CR4	−1.448	1.030	1.976	1.000	0.080	0.235
SIZE	0.553	0.245	5.094	1.000	0.012	1.738
ABSR0E	−0.293	0.336	0.759	1.000	0.192	0.746
PRFT	0.021	0.378	0.003	1.000	0.478	0.979
USLST	0.715	0.578	1.531	1.000	0.108	2.045
Basic materials	18.538	9793	0.000	1.000	0.998	0.000
Communications	0.695	0.624	1.242	1.000	0.265	2.004
Consumer, cyclical	0.783	0.458	2.923	1.000	0.087	2.188
Consumer, non-cyclical	0.573	0.574	0.997	1.000	0.318	1.774
Diversified	19.532	12983	0.000	1.000	0.999	0.000
Energy and utilities	−18.608	28174	0.000	1.000	0.999	0.000
Financial	0.888	0.581	2.337	1.000	0.126	2.430
Technology	1.434	0.536	7.171	1.000	0.007	4.196
Constant	−1.744	1.130	2.385	1.000	0.123	0.175
Cox and Snell R squared	0.089					
Nagelkerke R squared	0.162					
N	394					

Note: One-tailed results are reported for AIP, LEV, CR4, SIZE, ABSROE, PRFT, and USLST.

We encountered a few constraints during the course of this research. The sample of 66 quarterly reporters is a small portion of the population of 520 firms. This sample is further reduced in different analyses due to the omission of firms with missing data for certain variables. This may have reduced the strength of some of our tests or generalizability of some of the results.

Also, although it is important to test the usefulness of quarterly data *per se*, our paper focuses on comparing the effectiveness of quarterly reporting with that of semiannual reporting. Since annual data is prepared on a common basis for all firms, we rely mainly on such data to draw several of our comparisons. In any case, detailed quarterly data are not readily available for the quarterly reporters.

Furthermore, the data are from only one year. Although data for more than one year could enhance the generalizability of the results, we decided not to include observations for more than one year because data for online announcements are not available for prior years and we would have to control for the effects of institutional changes that had occurred in the years immediately prior to 2001.

In spite of the aforementioned shortcomings, we find results that can guide policy makers across different jurisdictions on whether or not to mandate quarterly reporting. A policy implication of this study is that quarterly reporting could enhance analyst following. But in a less transparent market than that of the United States, it would come at a price of increasing price volatility. Since under the more contemporary setting online reporting plays a better role of keeping the markets informed, policy makers could find it more beneficial than quarterly reporting to enhance market transparency.

Although our study was conducted in a fairly developed market setting, regions like the U require further research as the level of development of capital markets varies between

the countries of that region. Given the differences in results between our study and prior United States studies, we feel that the varying levels of development can cause quarterly earnings information to be variously interpreted in the market. Such has been the case for annual accounting disclosures (Alford et al., 1993).

Three questions have not been fully answered in this study: Is quarterly reporting very costly? Are quarterly earnings less credible than their annual counterparts? Will the investors of small companies benefit from mandated quarterly information as such firms disclose less through other means? We have considered proprietary disclosure cost in our study and, indirectly, we have considered the direct preparation cost through the use of firm size in our examination of the determinants of quarterly disclosure. Small firms find additional reporting costly, so the smaller the firm, the more costly the additional reporting will be. However, we know that size proxies for many variables. So, it may not be a very effective proxy for disclosure-preparation cost. Direct measures of preparation costs may be considered in future research.

Our results suggest that quarterly reports create returns volatility. Apart from the reasons discussed earlier, perhaps this occurs because the quarterly reports in our research are not fully audited. Unaudited information may lack credibility and, therefore, tend to make markets unstable. Although audit-quality research may support this contention, there is a need for more specific examination of the impact of unaudited frequent disclosures in the more contemporary accounting setting. Although frequency can lead to more timely dissemination of information, lack of credibility of the disseminated information may make the information set less relevant.

As for smaller companies, we do find that they tend not to issue quarterly reports. However, this may be due to those companies having fewer matters to disclose and or they may not have a large equity spread which requires greater disclosure. Given that smaller firms have their own idiosyncrasies, we suggest that their and their investors' needs be assessed through a separate study focused on their information setting.

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Book reviews

Worldwide Financial Reporting, The Development and Future of Accounting Standards, George J. Benston, Michael Bromwich, Robert E. Litan, Alfred Wagenhofer, Oxford University Press, New York (2006), vi + 326 pages, US\$ 45.00, £ 26.99, € 42.81, ISBN: 13 978-0-19-530583-8, ISBN: 0-19-530583-3

Growing globalization of capital markets drives the demand for internationally comparable financial reporting information. However, despite investors' increased desire for a single set of internationally accepted financial reporting standards, differences across countries will remain with respect to rules governing markets and financial reporting for the foreseeable future. This was, according to the authors, the central motivation for writing this book, whose declared objective is "to educate investors about the nature and trends in financial reporting in the major industrialized countries and, in particular, those that are home to the largest capital markets in the world" (p. 4).

The work of Benston et al. follows, like other international financial reporting books, both an issues and a country approach. It can be subdivided into three main parts starting off with the three initial chapters which discuss selected financial reporting issues and provide the basis for the second part, where the financial reporting regulations of four major countries (United States, chapter 4; United Kingdom, chapter 5; Germany, chapter 6; Japan, chapter 8) and the European Union (EU, chapter 7) are analyzed. This "country analysis" ends with a comparative assessment of the different reporting regimes discussed (chapter 9). The last part of the book deals with the future of financial reporting by considering amongst others the costs and benefits of a single versus a multiple set of accounting and auditing standards as well as the establishment of an effective oversight and enforcement regime (chapter 10). It ends by summing up the future challenges for standard setters and charting suggestions as to how these challenges could be tackled (chapter 11).

The introductory chapter is used to discuss several threshold issues related to financial reporting, including the benefits of equity-stock ownership and major trends in equity investments around the world. Despite an increased interest in internationally comparable financial reporting information resulting from the globalization and cross-border integration of capital markets, inter alia, fostered by new trading technologies and internet communication, the authors do not believe "that harmonized rules – which the authorities currently feel committed to – are either desirable (because they are likely to lag behind market developments by substantial margins) or are a stable outcome (because national bodies are likely to depart from international norms in the meantime)" (p. 15). This statement is further developed in later chapters.

Chapter 2 discusses the usefulness of audited financial statements for financial statement users (especially for non-controlling investors) and limitations of financial accounting information. The chapter provides a broad overview over the shortcomings of financial accounting information and touches on a variety of different issues, as for example, limitations resulting from reporting economic values, and measuring net income. Due to the subjectivity involved in reporting economic values the authors criticize the increased use of fair values in accounting and the IASB's and FASB's move towards an "asset liability" model. Trustworthiness is emphasized as a major quality of useful financial reporting information. The chapter ends with a discussion on the value of audits and the incentives auditors have to render competent and truthful attestations.

Structures and regulatory regimes of accounting and auditing standards for meeting the demands of financial statement users are very compactly examined in chapter 3. Beginning with the benefits of promulgated auditing and accounting standards from the perspective of auditors and financial statement users, the chapter continues with a discussion on the advantages and disadvantages of private versus government standard setting. This is followed by a brief overview over the arguments brought forward in the current debate on principles-based versus rules-based accounting standards and a clear pronouncement of the authors in favor of a principles-based approach. The chapter concludes with other forms of government involvement illustrating attempts to prevent the auditing profession from discouraging competition.

Chapters 4–8 review the financial reporting regimes of the United States, United Kingdom, Germany, the EU and Japan. Though each chapter follows a different structure to meet national peculiarities, all individual "country chapters" first provide a brief description of the main characteristics of each country's financial system and the historical development of the regulatory structure. The analysis then continues for each country surveyed with a description of the key elements of the present regimes in force regulating the financial reporting of companies including regulations and regulatory bodies governing accounting (also discussing the role of International Financial Reporting Standards, IFRS), auditing, corporate governance, and investor protection. Each "country chapter" ends with an assessment of shortcomings and current issues related to the present regulatory financial reporting regime, revisiting, in the U.S. chapter, *inter alia*, the debate on principles-based versus rule-based accounting standards, for example. Chapter 7, dealing with the corporate financial reporting regulation in the EU, applies a similar approach. It surveys the EU's initiatives to harmonize financial reporting of companies across its member states and discusses the EU's old regulatory settings as well as current issues and initiatives related to accounting (including the adoption of IFRS), shareholder protection, auditing, and enforcement.

Chapter 9 summarizes and contrasts the key financial reporting regimes in the four countries surveyed and the EU. The authors identify many similarities but reveal, also, major differences between the regulatory regimes under study. Given the remaining differences, despite the efforts put into harmonization and convergence the question is raised "does diversity matter, and how can it be dealt with?" (p. 206). After discussing various strategies for how companies and investors can cope with diversity, the authors conclude: "Financial disclosure in a country emerges as one of a number of interacting factors that together make up the national financial markets and corporate governance regime. Changing just one of the factors in this complex nexus, say financial reporting standards, may destroy an extant subtle balance and result in a reduction of the efficiency of capital markets" (p. 211–212).

Those who expect to receive details on current accounting and auditing principles in force in the countries examined will be disappointed. Tailored to its targeted audience (which is investors), the presentation of each country's accounting and auditing regulations is in this book – in contrast to other international accounting books – restricted to a description of major principles; though a somewhat fuller analysis of the differences between U.S. Generally Accepted Accounting Principles (US GAAP) and IFRS as well as accounting rules of some other leading countries is provided in an appendix to chapter 9.

Recognizing the pressure from product and financial markets driving the requirement for transparent, internationally comparable, high-quality financial reporting, on the one hand, and continued supremacy of national rules governing corporate reporting, as revealed by the countries surveyed in previous chapters, on the other hand, the authors analyze and consider in chapter 10 to what extent globally uniform accounting and auditing standards should be established. Given the remaining differences among the key countries analyzed, the problems experienced in the convergence process of IFRS and US GAAP and the difficulties involved in the uniform application and interpretation of international standards, the authors argue that a single set of unanimously agreed-on global standards is neither likely to be developed and sustained nor regarded as desirable as the advantages of uniform standards may be outweighed by the disadvantages of a monopoly standard setter. Therefore, the authors believe “that ‘constrained competition’ within a small set of high-quality standards offers the most feasible and flexible setting to cope with increasingly global capital markets. This option would achieve some of the benefits of both competition and standardization” (p. 242). With respect to auditor oversight and enforcement, Benston et al. propose “upgrading rather than convergence” (p. 250) first, before international harmonization should eventually be driven forward, beginning with more coordination of national enforcement activities.

The authors end their book by reviewing their major arguments developed in previous chapters and considering ways in which financial statements could be made more useful for financial statement users. The asset liability approach with the increasing use of fair values and the FASB's and IASB's joint revenue recognition project are key issues examined. Given the difficulties associated with the determination of trustworthy economic values of assets and liabilities, the authors “prefer financial statements based on traditional amortized historical cost based on actual market transactions, with revaluations grounded on reliable prices that can be audited and verified” (p. 270). Founded on this preference, an alternative approach to valuation is proposed including the usage of “current market prices and professionally validated estimates of them ... where they reflect the economic values of the firm's resources and are objectively measured and verified (i.e., are trustworthy)” (p. 271). the preservation of the traditional “revenue expense” approach based on the matching concept and voluntary supplementary disclosure.

In summary, the book does a good job in providing an up-to-date description and comparison of the regulatory financial reporting regimes of the United States, United Kingdom, Japan, Germany, and the European Union for its targeted audience of investors, which, one assumes, are not intended either to be specialists in the financial reporting regimes and regulations of the countries surveyed, or interested in a rigorous analysis of fundamental theoretical issues. Accordingly, the authors' discussions and conclusions on key financial reporting issues are well reasoned, without overwhelming the reader with academic research

findings and theoretical issues. The proposals developed are not beyond controversy and, therefore, should stimulate further discussions.

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Corporate governance and accountability, Jill Solomon, 2nd ed., John Wiley & Sons, Chichester, UK (2007), xvi + 386 pages, £ 30.99, €48.11, \$65.00, ISBN 0-470-03451-3

1. Introduction

The dynamic concept of corporate governance and its underlying themes and issues continue to challenge practitioners and academics alike with its constant review and reforms, at a national and international level. As the author points out the term corporate governance is one of the most commonly used phrases in the current global business vocabulary. The author presents a text which is well written, easily understood and extremely informative. First published in 2003, this second edition of the book updates the first and includes new features. The author's and colleagues' latest research is also summarized and referred to within the text. The book will be useful to undergraduate and masters students, as well as practitioners interested in critically thinking about their role within a corporate-governance framework. It includes the key literature pertaining to corporate governance, which is extremely useful for those undertaking research.

2. Overview

The book is divided into three parts, with 11 chapters. It provides an overview of corporate governance. In Part I the author sets out the corporate-governance framework and mechanisms with a clear U.K. focus before providing a summary of global corporate-governance systems in Part II. The book concludes in Part III with an extremely interesting examination of the ways that corporate governance has evolved to include stakeholder concerns as well as shareholder accountability. The book, which is supported by the author's and colleagues' research, includes an Enron case study and an analysis of Parmalat, the "European Enron". Particular features of the book are the chapter summaries and questions for reflection and discussion, which are extremely useful, not only for those studying corporate governance but also for those delivering corporate-governance units at undergraduate and postgraduate level.

The author defines corporate governance as "the system of checks and balances, both internal and external to companies, which ensures that companies discharge their accountability to all their stakeholders and act in a socially responsible way in all areas of their business activity" (p. 14). The main premise of the book is based upon the perceived shift from the shareholder-based model of corporate governance, with attention being principally focused on making companies more accountable to shareholders, to an increasing emphasis on meeting the needs of a broad range of stakeholders. The author argues that theoretical frameworks that

suggest companies should only be accountable to shareholders are not necessarily inconsistent with theoretical frameworks, which favor stakeholder accountability. The author also observes that this wider stakeholder approach, linked to social responsibility and to some extent an ethical approach to business, is not necessarily inconsistent with corporate profitability. This belief is, as the author states, founded "on a growing body of literature and empirical evidence that suggests that corporate accountability, which takes into account a broad range of social, ethical and environmental factors, is conducive to financial performance" (p. 29).

3. Part 1

Part I, which consists of chapters 1–6 deals with corporate-governance frameworks and mechanisms. Chapter 1 first defines corporate governance before dealing with the theoretical frameworks of agency, transaction cost, and stakeholders. The author compares and contrasts these before noting that they are "different lenses through which the same problems may be observed and analysed" (p. 23). Chapter 2 deals with corporate-governance failure with particular reference to "Enron" and "Parmalat". The main focus is the "Enron" case study which illustrates the dangers associated with weak corporate governance and ineffective checks and balances. The author observes that while the U.S. and Italian corporate-governance systems are very different, it is interesting to note that they are equally vulnerable to similar forms of abuse and corporate-governance weaknesses. Chapter 3 focuses on U.K. corporate-governance reform, which the author states has, since the first edition of the book, been subject to over-all fine tuning and refining of corporate-governance mechanisms rather than dramatic changes and reforms. The chapter provides a useful historic overview and summary of the corporate-governance reports from the Cadbury Report (1992) to present day. The chapter introduces the corporate-governance codes of practice and policy documents and explains the U.K. self-regulatory/voluntary approach to corporate governance, described as the "comply or explain" approach, aimed at encouraging compliance with its associated "good" corporate-governance culture rather than strict statutory code. This approach has not been adopted at a global level and many countries have adopted a more legalistic and statutory approach. It also highlights the important link between governance and financial performance, before concluding with the development of corporate-governance ratings, which impact on shareholder wealth. Chapter 4 deals in some detail with the role of the board of directors, focusing mainly on U.K. listed companies. The chapter covers the main initiatives supported by academic literature from board structure to the increasingly important role of the non-executive director. The board is compared to a "healthy heart" that needs to be "healthy, fit and carefully nurtured for the company to run effectively" (p. 77). The author outlines the corporate-community response to the Higgs Report (2003) and considers the arguments put forward by the literature relating to whether non-executive directors play a useful corporate-governance role. The chapter highlights the initiatives to widen the non-executive "gene pool" recommended by Higgs (2003) and Tyson (2003). It closes with a view that the board is subject to a complexity of dynamics which leads to perhaps a need to consider not only an "agency theory, finance paradigm" but also other disciplines, such as "management science" when seeking "understanding of board as corporate governance mechanisms" (p. 104). Chapter 5 considers the role of the institutional investor, highlighting the monitoring aspect in the context of agency theory. The

chapter explains how the ownership structure has become more concentrated in the hands of a small group of large institutional investors and the related, complex web of ownership, as exemplified by pension fund investment management. The chapter also deals with the increasing activity of the institutional investor, with special reference to research into institutional investor voting in the U.K. and the impact of shareholder activism on corporate performance and company value. Chapter 6 is dedicated to the way in which corporate transparency contributes to corporate governance and the associated mechanisms by which companies may become more transparent. A particular feature of this chapter is the section dealing with the emerging areas of governance reporting and forward-looking narrative reporting. Other key aspects of the chapter include the importance of risk disclosure and the role of the audit in corporate governance linked to the agency problem.

4. Part II

Part II of the book focuses on the theme of global corporate governance. Chapter 7 introduces corporate-governance systems worldwide, based upon the main determinates of ownership structure and legal frameworks while recognizing the impact of cultural and other influences. The author acknowledges the difficulty associated with the categorization of a country's corporate-governance system but adopts the accepted "insider" and "outsider" model (p. 182), while offering the view that there is a real possibility that corporate governance will converge at a global level. Chapter 8 provides a reference dictionary of corporate-governance systems of selected countries that seeks to illustrate the broad diversity arising from their own legal frameworks, corporate ownership, structure, culture, and economic factors. This chapter clearly meets its aim of providing a flavor of the rich diversity of corporate-governance systems internationally. However, it could benefit from elaboration or even form the basis in its own right of a comparative text on international corporate-governance systems.

5. Part III

Part III broadens the debate on corporate governance by "extending the theoretical paradigm from a narrow agency theory perspective to encompass a stakeholder theory perspective" (p. 231). The author does this very successfully in chapter 9 by considering the growth of corporate social responsibility and highlighting the potentially strong impact of corporate behavior on a wide range of stakeholders. This is supported by a discussion of the social, ethical, environmental, and sustainability disclosure which has the potential of discharging their accountability to a wide range of stakeholders. The author notes the importance of environmental and sustainability corporate reporting in achieving wider accountability to both shareholders and corporate stakeholders. This is supported by a growing perception that "good management of social and environmental issues is a reflection of good general management, which is helping to drive the sustainability agenda" (pp. 263–264). The chapter concludes by considering the academic debate that exists over the stakeholder engagement and its genuine success in promoting corporate accountability. Chapter 10 develops the theme of a broadening corporate-governance agenda through its analysis of the role of institutional investors in driving corporate social responsibility by taking account of environmental, social, and governance factors in their investment

decisions. This analysis extends to consideration of socially-responsible investment strategies and investments and their drivers and profitability. The author reports upon the increasingly sophisticated engagement and dialogue that is emerging between institutional investors and their investee companies in the area of social and environmental information as part of socially-responsible investment. The author offers the view that such issues are now being integrated into the heart of corporate-governance concerns for the institutional-investment community. The chapter concludes with the statement that "this represents a deep change in the attitude of business and financial institutions towards social responsibility, endorsing a broader remit than that encapsulated by pure agency theory" and that a "broader agenda for corporate governance, which embraces a stakeholder theory approach, may no longer be viewed as inconsistent with value creation in the long run" (p. 302). Part III concludes with chapter 11 which provides a brief insight into the author's view of the future direction of corporate governance and accountability, which touches upon investor activism, the global convergence in corporate governance, and corporate-governance reform.

In conclusion, it is fair to say that the author achieves the stated aims of this work in an informative and easily-read format. The book not only provides a great deal of explanation and detail on the topic of corporate governance and accountability for undergraduates and practitioners alike, but also provides a very useful discourse on a range of associated theories, with reference to key literature on corporate governance and accountability, for postgraduates embarking on their research.

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Financial statement analysis and security valuation, Stephen H. Penman, 3rd ed. McGraw-Hill/Irwin, International edition (2007), xxix + 776 pages, £44.99, ISBN-10: 007-125432-3

Penman's book is a well crafted volume, which offers plenty of content including detailed material on "hands-on" financial statement analysis and valuation. It is comprehensive and such, the 2nd edition was widely adopted. The book provides a helpful reference for students in economics and business, particularly for MBA candidates. Penman's book also serves the needs of professionals who are confronted with valuation

tasks in everyday life. The book is intended primarily as a book about doing. Hence, it takes a pragmatic viewpoint and is suited as a standard textbook for courses that aim at a preparation for practical valuation tasks. The 3rd edition has kept this intention as well as the basic structure of the 2nd edition. While the book has gained somewhat in length, the overall outline of the topics has kept its clarity.

Penman's 3rd edition is structured along five main parts with two introductory chapters. These cover the basics of statement analysis and valuation (Part I, Chapters 3 to 6), statement analysis with a focus on value generation (Part II, Chapters 7 to 12), methods of forecasting corporate payoffs (Part III, Chapters 13 to 15), quality aspects in accounting (Part IV, Chapters 16 and 17) and finally risk considerations (Part V, Chapters 18 and 19). While Parts II to V can be considered as electives, Part I forms the mandatory core part of the book. It contains an introductory guide in the analysis of financial statements from the U.S. perspective and provides a summary of financial market history, which includes results on long run average returns on important asset classes. Part I then continues with a discussion of accrual accounting and the application of important alternative valuation models. These models include the method of multiples, dividend discounting, cash flow discounting and the residual earnings model.

There are several introductory treatments of financial statement analysis and valuation. The classic corporate finance textbook by Brealey, Myers, and Allen (2005), for example, offers a compact introduction to security valuation in its 4th chapter. That chapter may well serve for a bachelor's level course but also for an introductory master's level course (especially when the program is not focused on fundamental valuation issues). More comprehensive treatments of the subject within a full one-semester course surely ask for more intense textbook treatments. One example to note is the textbook by Soffer and Soffer (2003). The latter authors offer a book, which is relatively compact while it covers contents in an elegant and consistent manner. A clear advantage of Penman's textbook is its comprehensiveness and its richness in interesting practical examples. Most of them are compact case studies drawn from recent real-world problems. This feature offers a great amount of exercises and allows lecturers to choose their collection of favorite examples for in-class discussion. Moreover, it offers plenty of training opportunities to students. Making lecturing with the textbook an even more rewarding task, Penman has updated and extended his set of "real-world" examples in the 3rd edition. In this sense, the book offers a unique view of financial analysis.

Financial statement analysis surely has many limitations. At least some of them should be noted on a textbook level. Also, putting a critical eye on valuation results is an important skill. Penman does address these issues in the book. On page 8, for example, Penman refers to the 1990s stock market bubble and points out examples of speculative financial analysis. As an example, he gives a critical assessment of a valuation of America Online Inc. as done in 1999. The 2007 valuation perspective is clearly other than the one in 1999, but Penman shows with his examples how to develop sound and critical valuation skills. And with all that sound fundamental analysis, Penman does not neglect the psychological aspect of price assessments during a potential period of exaggerated valuations: "In a bubble, investors behave as if they are joining a chain letter. They adopt speculative beliefs that are then fed on to other people" (p. 7). This critical perspective on valuation is kept throughout the book. Another example is the case of MCI WorldCom on page 49, which points out to the (now

better known) limits of financial statement analysis, which arise from potential balance sheet manipulation. The book offers an intense discussion of accruals, which are known to be particularly critical in valuation (see Part I). Chapter 17 is on statement quality and includes special sections such as "Sensitive areas that are prone to manipulation" (Table 17.2, p. 643) and "Situations where manipulation is more likely" (Table 17.3, p. 644).

Considering the textbook for a class, which is taken in part by students in a finance program, I have made the experience that it is advisable to use Penman's volume for a course at an early stage where it will be more appropriate. Finance students at later stages sometimes get confused with several terms and concepts, which they were taught in finance classes as concepts are sometimes understood and used quite differently within Penman's text. Examples are statements like "avoid trading at the wrong price" (p. 4), which may—at least to some—indicate the operational risk of a mis-trade, while what is meant is of course "avoid trading at the given market price when it deviates from a given subjective fundamental value assessment". Also the question for an arbitrage opportunity due to the potential mis-valuation of a single corporation (case on page 107) sounds a little odd to those who understand the no-arbitrage concept in the sense of financial economics. Here, it would be better to point out to portfolios of mis-valued assets and then use the notion of (statistical) no-arbitrage in the sense of the Arbitrage Pricing Theory (APT). Also, empirical evidence, such as the book-to-market anomaly, could be cited and would provide a sound justification for the "activist approach" as taken in the book (p. 3–6). This would strengthen the book's obvious perspective that real-world capital markets are inefficient. However, it remains unclear in the book what the overall investment strategy in buying single fundamentally undervalued stocks would be and what its prospective performance could be. To my knowledge, there is little evidence that fundamental analysis has led to consistent superior performance except for a few exceptional investors. The appropriate argumentation that while obtaining ultimate diversification at low cost "the index investor is in danger of paying too much" (p. 5) would rather point out that diversified strategies may work as a perfect synthesis of the advantages of indexing together with those from sound fundamental analysis.

From the teaching perspective, it is a standard question how many different textbooks should be used to accompany a course. Penman's textbook is surely very well suited to be considered as a sole textbook source due to its richness as indicated above. Still, students sometimes feel that the text is relatively long—not only overall, but also when referring to a single subject matter—and hence ask for a more condensed outline of the subject. The summary of formulas in the appendix at the end of the book as well as each "Analysts Toolkit" at the end of each chapter both clearly help to focus on the major issues. Still, some readers may have the impression that fundamental principles, which are relatively few and non-technical, as well as their interaction appear less obvious due to the immense amount of other information, sometimes repetitions or other verbal discussion in the book. This matter seems to be due to a fundamental, potentially hard to manage, trade-off between comprehensive and focused coverage of contents.

Penman's great job with the book is that—in many regards—it integrates finance theory with accounting concepts. The obvious aim of his concept is to efficiently use disclosed information for valuation purposes. Seen from the finance perspective, some readers may ask for a textbook with more content on valuation models and their critical assessment.

Asset pricing models are briefly noted on page 98 yielding the impression that there is only “beta bashing” according to the CAPM and nothing else in the literature. The appendix to Chapter 3 points out the APT and the Fama–French three-factor model. While any of these asset pricing models is admittedly unreliable (leaving room for discussion about the appropriate required rate of return as it is stated in the text, see p. 115–116), any unreliable estimate of the rate of return will have a substantial impact on the reliability of the valuation results as derived in the book (Chapter 18 on risk analysis hardly addresses this issue as it is a summary on standard risk management tools in finance). Also, it is exactly models such as the one by Fama and French, which would be the ones to close the gap between finance and accounting. It would be helpful to find a related discussion in the text. In summary, a more integrated treatment could contain more theory and empirical findings in terms of asset pricing models and the cost of capital, thereby focusing on ways of practical model implementation. Given results on model performance, this could finally be combined with the cutting-edge valuation applications of the present textbook. To my knowledge, there is no book to fill this gap to date. However, it could be a future line along which the book (or a new issue) could be developed.

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The Illinois International Accounting Symposium

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Other than an international dimension, there is no particular theme for the Symposium.

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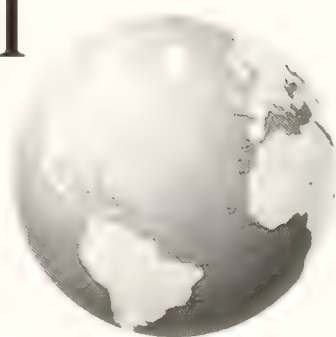
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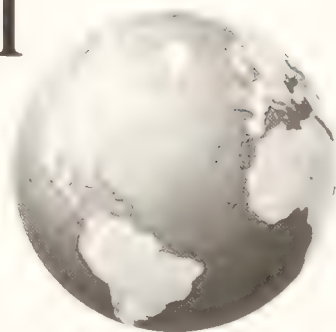
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Type of earnings management and the effect of ownership structure, firm size, and corporate-governance practices: Evidence from Indonesia

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Abstract

The purpose of this study is to investigate whether companies listed on the Jakarta Stock Exchange (JSE) conduct efficient or opportunistic earnings management and to examine the effect of ownership structure, firm size, and corporate-governance practices on it.

Using multiple regressions, we find evidence that the type of earnings management selected by JSE listed firms tends toward efficient earnings management. This evidence is inconsistent with the common view that earnings management in Indonesia is opportunistic. Family ownership has a significant influence on the type of earnings management selected. Firms with a high proportion of family ownership and non-business groups are more inclined to choose efficient earnings management than other types of firms. We find inconsistent evidence with regard to the impact of institutional ownership, firm size, and corporate-governance practices on type of earnings management.

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Keywords Type of earnings management, Ownership structure, Firm size, Corporate governance

1. Introduction

This study examines whether earnings management in public firms in Indonesia is motivated by opportunistic behavior or efficient contracting. This study is motivated by the

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common perception that earnings management by Indonesian public firms is opportunistic. This study also investigates whether ownership structure, corporate-governance practices, and firm size influence the type of earnings management selected.

There are two types of earnings management: efficient earnings management (i.e., to improve earnings informativeness in communicating private information) and opportunistic earnings management (i.e., management reports earnings opportunistically to maximize his/her utility) (Scott, 2000). Burgstahler and Dichev (1997) and Balsam, Bartov, and Marquardt (2002) present evidence that is consistent with the opportunistic perspective. On the other hand, Subramanyam (1996), Gul, Lung, and Srinidhi (2000), and Krishnan (2003) conclude that the behavior of discretionary accruals (a proxy for earnings management) is consistent with the efficient perspective, because discretionary accruals have a significant positive relationship with future profitability.

There has been extensive research on earnings management; however, literature concerning factors that influence the selection of a particular type of earnings management is quite rare. Krishnan (2003) finds that external auditing is often used as a proxy for corporate-governance practices and plays an important role in constraining opportunistic earnings management. Other proxies are the proportion of an independent board and the existence of an audit committee. Hence, these corporate-governance mechanisms could also influence the type of earnings management uses. In addition, firm size and ownership structure could also play important roles in restraining opportunistic earnings management. However, the extant literature has not examined these possibilities.

Company size is used as a proxy for information asymmetry in the predisclosure information environments, as managers of small companies are able to retain their private information more successfully than their counterparts in large companies (Lee & Choi, 2002). Information on large firms usually is more publicly available and could be obtained with lower costs than information on small firms (Bhattacharya, 2001). Because larger firms are more easily scrutinized by investors or regulators than smaller firms, the former type is expected to engage in less opportunistic earnings management than the latter.

Ownership structure influences the monitoring mechanism a company uses, including the monitoring of earnings-management activity. Balsam et al. (2002) state that institutional investors, who are sophisticated investors, are more capable of detecting earnings management than non-institutional investors because they have more access to timely and relevant information. Existing literature only examines the effect of institutional investors on earnings-management *magnitude*, while our study will examine the effect of institutional investors on the *type* of earnings management.

Institutional investors have a greater monitoring role if the company's ownership structure is widely dispersed. Wide-spread ownership structure only takes place in Anglo-Saxon countries, such as the United States and the United Kingdom. In other developed and developing countries, firms usually are controlled by founding families. La Porta, Lopez-de-Silanes, and Shleifer (1999), report that 85% of Spanish firms have controlling shareholders, compared to United States and the United Kingdom, which have only 10% and 20%, respectively. Arifin (2003) also finds that the majority of public firms in Indonesia is controlled by families. He suggests that agency problems in family-controlled firms are not as serious as that in publicly-controlled firms or firms without

controlling shareholders. In the former, there are fewer agency problems because the conflict between principal and agent is less than that in the latter. However, as Claessens, Djankov, Fan, and Lang (1999) find, family-controlled firms, through pyramid ownership structure and their business group, expropriate minority shareholders (i.e., the public). In this study, we suggest that in family-controlled firms with no business groups, the motivation to expropriate minority shareholders is less and thus the earnings management in these firms tend to be relatively more efficient.

Our sample consists of 144 firms for the years of 1995 to 1996 and 1999 to 2002. We excluded the years 1997 and 1998 (the Asian financial crisis period) because Indonesia experienced a heavy economic crisis in those years that resulted in financial statements for most firms being highly distorted from the normal period.

Although our evidence regarding type of earnings management is mixed, it tends to be more relatively efficient earnings management. This finding is inconsistent with the usual view that earnings management (in Indonesia) is opportunistic. We also find that family ownership has significant influence on type of earnings management; firms with a high proportion of family ownership and non-business groups are more likely to adopt efficient earnings management efficient than other types of firms. There is no consistent evidence that institutional ownership, firm size, and corporate-governance practices have significant influence on earnings-management type.

This paper contributes to the literature on earnings management in several ways. First, the evidence in this paper suggests that firms largely owned by families and do not belong to business groups are more likely to choose efficient earnings management compared to firms with different ownership structures, thus, providing the first evidence that family ownership and business group influence the type of earnings management selected.

Second, we find no evidence that variables representing corporate-governance practices (audit quality, the independence of the board of commissioners, and the existence of an audit committee), influence on the type of earnings management. Our result is inconsistent with the hypothesis that corporate-governance practices provide monitoring mechanisms that constrain opportunistic earnings management. This finding may be due to the fact that the regulation on corporate-governance practice in Indonesia is relatively recent, so its effectiveness still remains to be seen.

2. Literature review

2.1. Corporate governance in Indonesia

A 1999 survey by PricewaterhouseCoopers, in which the respondents were institutional investors in Singapore, finds that corporate-governance practices in Indonesia are relatively inadequate (PricewaterhouseCoopers, 1999). The survey showed that among a dozen countries in the Asia Australia region, Indonesia ranked very low in the perceived standard of disclosure and transparency (Kurniawan & Indriantoro, 2000). According to the survey, Indonesia also ranked very low in other areas such as accountability to shareholders, board processes, auditing, and compliance.

To improve corporate governance in Indonesia, government and non-governmental organizations have taken several initiatives (Kurniawan & Indriantoro, 2000):

1. Developing a national strategy for the reform of corporate-governance, including setting up the National Committee for Corporate Governance (NCCG), recently changed to the National Committee for Governance (NCG).
Established by the Decree of the Coordinating Minister of Economics, Finance, and Industry in August 1999, the NCG's main responsibility is to recommend a national framework for the implementation of good corporate governance. This committee issued the Code of Good Corporate Governance to be used as a reference for regulating various corporate sectors, supporting professions, and training managers.
2. Conducting educational events on corporate governance for the public. The concept of corporate governance is fairly new in Indonesia. To introduce the concept to the public there have been several educational events conducted by several institutions (such as the Indonesian Institute of Accountants (IIA) and the Indonesia Institute of Corporate Governance (IICG)).
3. Conducting pilot projects to implement corporate-governance principles in the industries. There are major publicly listed companies that have implemented corporate-governance principles in Indonesia, such as:
 - PT Astra, one of the biggest conglomerates in Indonesia.
 - PT Indosat, a major telecommunication company.
 - PT Timah, one of the largest tin producers in the world.
4. Carrying out regulatory reform within the capital market.
To improve corporate-governance regimes within the capital market, Bapepam (The Capital Market Supervisory Agency), as the regulatory agency, has issued various rules and regulations, including:
 - A regulation requiring public companies to have independent directors and independent commissioners.
 - Regulations about the method of voting shares.
Comprehensive rules on the responsibilities for boards of directors and independent commissioners.
 - The role of auditors with regard to financial reporting and penalties for non-compliance.
 - Regulations on disclosure of related-party transactions.

To complement BAPEPAM rules regarding independent directors and independent commissioners, in the year 2000 the Jakarta Stock Exchange (JSE) issued rules concerning independent boards,¹ audit committees, and corporate secretaries for public listed companies. This rule – Decision Letter of PT Bursa Efek Jakarta No.: Kep-315/BEJ/06-2000, which was later amended by Decision Letter No.: Kep-339 BEJ/07-2001 – stated that publicly listed companies are obligated to fulfill the requirements by December 31, 2001 at the latest.

¹ In Indonesia, the board structure follows a two-tier system: the board of commissioners and the board of directors. The board of commissioners provides direction and supervises the board of directors in managing the firm. In the remainder of the paper, unless stated otherwise, the term "board" refers to the board of commissioners, "board of directors" refers to the board of directors in two-tier structure and "board_i" or "directors_i" refer to the board of directors in a one-tier structure.

According to this rule, the number of independent board members must be $\geq 30\%$ of the board size, and the independent board members should be:

- Individuals who have no affiliated relationship with controlling shareholders in related firms.
- Individuals who have no affiliated relation with company managers and/or board members of related listed firms.
- Individuals who are not engaged as officers in other firms affiliated with related listed firms.
- Individuals who understand stock exchanges rules.

An audit committee should have at least three members, one of whom must be an independent board member, who will act as chairman of the audit committee, and the other members should be independent external parties, at least one of whom has accounting and/or finance skills.

2.2. Prior research on efficient and opportunistic earnings management

Several studies find evidence consistent with the opportunistic perspective. Burgstahler and Dichev (1997) find that management engages in earnings management to avoid reporting losses or earnings decline. Balsam et al. (2002) find a negative relationship between unexpected discretionary accruals and stock returns around the earnings-announcement date. This result indicates that the market views discretionary accruals as opportunistic.

In contrast, other studies find evidence that is consistent with the efficient perspective. Subramanyam (1996) concludes that discretionary accruals are efficient because they have a positive, significant relationship with future profitability. This positive relationship describes the ability that discretionary accruals have to communicate information about a firm's future profitability to the public. Gul et al. (2000) and Krishnan (2003), following Subramanyam (1996), also find consistent evidence.

2.3. Prior research on ownership structure

2.3.1. Family ownership

Wide-spread ownership structure is only found in the United States and the United Kingdom. In other developed and developing countries, most companies are still controlled by family ownership. La Porta et al. (1999), as cited in Arifin (2003), report that 85% of Spanish firms have family controlling ownership. Compared to the United Kingdom and the United States which have only 10% and 20%, family ownership, respectively. Thai firms (Wiwattanakantang, 2000), Belgian firms (Crijs & De Clerck (1997), are cited in Van den Berghe & Carchon (2001)), Turkish firms (Sarac, 2002), Egyptian firms (Shahira, 2003), and Indonesian firms (Arifin, 2003), are also controlled by founding families.

Family-owned firms should be more efficient than publicly-owned firms because there are less monitoring costs in family-owned firms (Fama & Jensen, 1983). McConaughy, Matthews, and Fialko (2001), Yammeesri and Lodh (2001), Suehiro (2001), and Anderson

and Reeb (2003) find that family-controlled firms are valued higher or perform better than other firms. Anderson and Reeb (2003) show that minority shareholders in large U.S. firms benefit from the presence of founding families.

Arifin (2003) finds that in his sample of publicly listed firms in Indonesia, family-controlled firms, state-owned firms, or institutional-controlled firms have fewer agency problems than publicly-controlled firms or firms without controlling shareholders.² He suggests that the agency problems in family-owned firms are fewer because there is less conflict between the principal and agent. But, if there are minority interests in family-owned firms, there is another agency problem, namely a conflict of interests between majority (family) and minority ownership.

Claessens et al. (1999) find that higher cash-flow rights are associated with higher market valuation, but higher control rights are associated with lower market valuation, especially when cash-flow rights are low and control rights are high. This suggests expropriation of minority shareholders by controlling shareholders. They conclude that family control is an important factor behind the negative relation between control rights and market valuation.

If family ownership represents an efficient organizational structure, then in family-owned firms opportunistic earnings management will be limited. However, in firms with business groups (in Indonesia most publicly listed firms have business groups), this pattern may not hold. For firms belonging to business groups, most of the owners' capital is not invested in a single company, but rather is spread over several companies. If any portion of that capital is invested in public firms, then expropriation of minority shareholders and thus opportunistic earnings management is likely to occur, even if the company is controlled by one family. This happens because public firms are exploited by the owners who use them to collect funds from the public which are in turn transferred to other firms in the business group. Kim and Yi (2005) find evidence that opportunistic earnings management is higher in firms with business groups compared to firms without them. Their results suggest that firms with business groups give their controlling shareholders more incentive to engage in earnings management.

2.3.2. Institutional ownership

Institutional investors are generally expected to be able to use current information to predict future earnings better than non-institutional investors (Jiambalvo, Rajgopal, & Venkatachalam, 2002). According to the Financial Economists Roundtable Statement on Institutional Investors and Corporate Governance (1999), increases in institutional ownership is an entity provides strong incentive for an investor to actively monitor and influence management's policy for that entity.

El-Gazzar (1998) and Bhattacharya (2001) conclude that institutional investors, who have more wealth and resources to gather information than non-institutional investors, tend to use more expensive and more value-relevant information in forming earnings

² There are agency problems in state-owned firms, because the principal is the public. But the public in its role as a principal cannot monitor management directly. Instead they are represented by the government. Since government is not the genuine principal, it is less motivated to monitor management (including monitoring on earnings-management activity), which finally will harm the public.

expectations. Jiambalvo et al. (2002) find evidence that is consistent with the view that institutional investors also use non-earnings information to predict future earnings.

Balsam et al. (2002) find evidence that market reaction arising from the behavior of sophisticated investors (institutional investors) occurs earlier than that of non-sophisticated investors. They argue that sophisticated investors have access to more information from other sources, more timely information, and are also more capable of decomposing earnings into discretionary and non-discretionary components. Bushee (1998) suggests that institutional ownership has a monitoring role that pushes managers to take actions that will not harm the company in the long run.

While in Indonesia context, Mitra (2002), Koh (2003), and Midiastuty and Machfoedz (2003) find evidence that high institutional ownership constrain earnings management in those firms. However, Darmawati (2003) does not find significant relationship between earnings management and institutional investors.

2.3.3. Firm size

Firm size is often used as a proxy for information availability in the market. Information for large firms should be more available in the market than for small firms. Albretht and Richardson (1990) find evidence that large firms have less incentive to smooth earnings than small firms. Lee and Choi (2002) also find that firm size is a variable that could influence a firm's tendency to manage earnings: smaller firms are more likely to manage earnings to avoid reporting losses than larger firms. But, Moses (1987) finds evidence that large firms have a bigger incentive to smooth earnings than small firms. Michaelson, James, and Charles (1995) also find consistent evidence.

2.3.4. Corporate-governance practices

2.3.4.1. Audit quality: Several studies examine the association between audit quality and earnings management. Becker, Defond, JiamBalvo, and Subramanyam (1998) and Francis, Maydew, and Spark (1999) find evidence that discretionary accruals in firms audited by Big 6 auditors are less than that in firms audited by non-Big 6 auditors. Krishnan (2003) finds that discretionary accruals in firms audited by Big 6 auditors have a higher positive relationship with future profitability than that of firms audited by non-Big 6 auditors. He says that auditing has a significant role in constraining opportunistic earnings management. However, Sandra and Kusuma (2004) find no significant evidence that audit quality has a moderating effect on the relationship between earnings management and stock returns in Indonesia. This result indicates that auditor size may not be a good proxy for audit quality in Indonesia.

2.3.4.2. Independent board. Indonesian corporate law stipulates that a corporation has to follow a two-board system consisting of a board of commissioners and a board of directors. The function of the board of commissioners is to oversee and supervise how the board of directors conducts the company's operation. Members of the board of commissioners are entirely different from the board of directors. However, being dominated by the majority shareholders, the boards of publicly listed companies in Indonesia are controlled by these majority shareholders in substance and these boards are not independent from each other.

To alleviate the potential expropriation of minority shareholders rights (i.e., the public shareholders), Badan Pengawas Pasar Modal (or Bapepam/the Capital Market Supervisory Body) acquires that at least 30% of the members of the board of commissioners must be independent from the company and from the majority shareholders. The existence and function of the so-called independent commissioners are similar to the non-executive members of the board under the one-board system, as the following studies show.

Dechow, Sloan, and Sweeney (1996) find that firms whose CEO also chairs the board of directors₁ are more likely to be subject to accounting enforcement actions by the SEC for alleged GAAP violation. Peasnell, Pope, and Young (2000) also find that the probability of income-increasing accruals decreases as the proportion of outside-directors₁ increases for a sample of U.K. firms. Chtourou, Bedard, and Courteau (2001) find that independent board₁ is constraining earnings-management activity. These studies are conducted for the one-board system. Indonesia uses a two-board system. There are also several studies related to the two-board system used in Indonesia. For example, Wedari (2004), who examines public firms in JSE from year 1994 to 2002, finds that an independent board constrains earnings-management activity. In contrast, Parulian (2004) finds that independent boards for the public firms in JSE have no significant influence on earnings management. Both these studies define independent boards as those where members of the board of commissioners are independent from the company and the majority shareholders.

2.3.4.3. Audit committee. Klein (2002a) finds that an independent audit committee and active audit committee are associated with lower levels of discretionary accruals for U.S. firms. Chtourou et al. (2001) find that income-increasing earnings management is negatively associated with a committee composed only of independent directors₁ that meet more than twice a year.

In Indonesia, Wedari (2004) finds that discretionary accruals of firms with an audit committee are significantly higher than that of firms with no audit committee. Parulian (2004) shows that negative discretionary accruals of firms with an audit committee is significantly lower than that of firms with no audit committee, but positive discretionary accruals of firms with an audit committee is not significantly lower than that of firms with no audit committee. But other studies find evidence that indicate the ineffectiveness of an audit committee as part of corporate-governance practices in publicly listed firms in JSE. Mayangsari (2003) finds the presence of an audit committee associated negatively with financial-statement integrity (proxied by the conservatism index). Nuryanah (2004) also shows that audit committee does not have a significant association with the value of the firm.

3. Hypotheses development and research model

3.1. Hypotheses development

There are two types of earnings management: efficient and opportunistic. Earnings management is efficient if managers use their discretion to communicate private information about firm profitability, which is yet to be reflected in the historical cost-based earnings, while it is opportunistic if managers use their discretion to maximize their utility, thereby garbling earnings (Subramanyam, 1996). Therefore, we test whether earnings management is efficient

or opportunistic by examining discretionary accruals' ability to signal future profitability. If earnings management is efficient, then discretionary accruals (earnings-management proxy) will have a significant *positive* relationship with future profitability. If opportunistic, discretionary accruals will have a significant *negative* relationship or insignificant relationship with future profitability. Since, the relation can go either way – positive if earnings management is efficient and negative if opportunistic – then the first hypothesis is non-directional.

Hypothesis 1a. There is a relationship between discretionary accruals and future profitability.

Family-controlled firms should be more efficient than publicly-owned firms because monitoring costs are lower in family-owned firms (Fama & Jensen, 1983). Anderson, Mansi, and Reeb (2003) show that although a founding-family ownership is quite prevalent and significant in U.S. industrial firms, their results do not support the hypothesis that continued founding-family ownership in public firms leads to minority shareholder wealth expropriation. Instead, their results show that minority shareholders in large U.S. firms benefit from the presence of founding families in the management. Arifin (2003) also says that agency problems in family-controlled firms are fewer than in publicly-controlled firms or firms without controlling shareholders.

Based on those results, we expect that family-controlled firms will constrain opportunistic earnings management. But this efficient structure in family-controlled firms is less likely found in firms with business groups – as we generally find in Indonesia. For firms belonging to business groups, the owners' capital is not usually invested in a single company. If any portion of that capital is invested in public firms, then expropriation of minority shareholders and thus opportunistic earnings management will be likely to occur even if the company is family-controlled. This is because owners exploit public firms by using them to collect funds from the public which in turn is transferred to other firms in the business groups. Kim and Yi (2005) find that earnings management in firms with business groups is higher than in firms with no business groups.

By combining both arguments, we suggest that firms with high family ownership and no business groups should be able to limit opportunistic earnings management, thereby increasing the association between discretionary accruals and future profitability.

Hypothesis 1b. The effect of discretionary accruals on future profitability is higher for firms with high family ownership and no business groups than for other firms.

Institutional investors are generally thought to be sophisticated investor who can be able to use current information to predict future earnings better than non-institutional investors (Jambalvo et al., 2002). According to the Financial Economists Roundtable Statement on Institutional Investors and Corporate Governance (1999), large institutional ownership in an entity provides strong incentive for investors to actively monitor and influence managements' policy for that entity.

Bushee (1998) finds that institutional investors create less incentive for management to cut research and development expenditures to attain short-term targets, a finding which also indicates that institutional investors play a role in monitoring management behavior. Jambalvo (1996) finds that absolute discretionary accruals have a negative association with institutional ownership. Balsam et al. (2002) conclude that because institutional investors have

access to more timely and relevant information, they could identify earnings management faster and easier than non-institutional investors. The results of these studies suggest that institutional ownership leads to a monitoring role, which in turn constrains opportunistic earnings management. Therefore, we formulate the following hypothesis.

Hypothesis 1c. The higher the proportion of institutional ownership, the higher the effect of discretionary accruals on future profitability.

Company size is used as a proxy for information asymmetry in the predisclosure information environment, as managers of small companies are able to retain their private information more successfully than managers of large companies. As firm grows in size, the information on that firm becomes more publicly available.

Further, investors and the public in general tend to follow and scrutinize large firms more closely than small firms, making it more difficult for large firms to manage earnings opportunistically than for small firms. Consistent with this view, Albretht and Richardson (1990) find evidence that larger firms are less motivated to smooth earnings than smaller firms. Lee and Choi (2002) also find that company size appears to play a primary role in discriminating between companies that do and do not manage earnings to avoid losses. Small companies tend to manage earnings more frequently to avoid losses than do large companies. Given that large firms have less information asymmetry and are more scrutinized than small firms, we expect that they are less likely to manage earnings opportunistically, and eventually will increase the association between discretionary accruals and future profitability.

Hypothesis 1d. The effect of discretionary accruals on future profitability is higher for firms with high market capitalization than for firms with small market capitalization.

We argue that the existence of corporate-governance practices in a firm will limit opportunistic earnings management. In our study we employ audit quality, proportion of members of the board who are independent, and the existence of an audit committee as proxies for corporate-governance practices.

Audit quality according to DeAngelo (1981, p. 186) is a market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach. This suggests that high audit quality should limit opportunistic earnings management. Becker et al. (1998) and Francis et al. (1999) find that earnings management in firms audited by Big 6 auditors is smaller than in firms audited by non-Big 6 auditors.

According to the Independent Commissioner Guidelines from the National Committee for Governance (NCG), one of the independent commissioner's tasks is ensuring a firm's financial statement's transparency and faithfulness. It implies that independent commissioners should notice that management could engage in earnings management, either for efficient contracting or opportunistic purposes. Chtourou et al. (2001) find that independent board₁ will constrain earnings-management activity.

The board of commissioners of a public firm is required to establish an audit committee. Overseeing the firm's financial-reporting process is one of the audit committee's tasks. It meets regularly with the external and internal auditors to review the corporation's financial statements, audit processes, and internal controls. Therefore, its existence will ultimately induce the company to produce more accurate financial statements or, in other words, less

opportunistic earnings management. Klein (2002b) concludes that a less independent audit committee will increase discretionary accruals.

Based on the above explanations, we expect that the higher the audit quality, the higher the proportion of independent board members, and the existence of an audit committee will restrain opportunistic-earnings management and, eventually, will increase the effect of discretionary accruals on future profitability.

Hypothesis 1e. The effect of discretionary accruals on future profitability is higher on firms audited by Big 4 auditors than on firms audited by non-Big 4 auditors.

Hypothesis 1f. The higher the proportion of independent board members, the higher the effect of discretionary accruals on future profitability.

Hypothesis 1g. The effect of discretionary accruals on future profitability is higher on firms with an audit committee than on firms with no audit committee.

3.2. Research model

Following Subramanyam (1996), to test Hypothesis 1a, we use the following research model:

$$X_{t+1} = b_0 + b_1\text{CFO}_t + b_2\text{NDAC}_t + b_3\text{DAC}_t + b_4\text{DFAM}_t + b_5\text{INST}_t + b_6\text{DSIZE}_t + b_7\text{AUDIT}_t + b_8\text{BOD}_t + b_9\text{AUDCOM}_t + b_{10}\text{D99}_t + b_{11}\text{D00}_t + b_{12}\text{D01}_t + e \quad (1a)$$

where:

X_{t+1}	future profitability, measured by each of the following variables: (1) CFO _{t+1} , or (2) NDNI _{t+1} , or (3) ΔEARN _{t+1} . All scaled by beginning total assets
CFO	cash flows from operating activities
NDNI	non-discretionary net income
ΔEARN	change in earnings
NDAC	non-discretionary accruals
DAC	discretionary accruals
DFAM	one if a firm has a proportion of family ownership > 50% and does not belong to business groups and zero otherwise
INST	proportion of institutional ownership
DSIZE	one if a firm has market capitalization above mean and zero otherwise
AUDIT	one if a firm is audited by Big 4 auditors and zero otherwise
BOD	proportion of independent board members
AUDCOM	one if a firm has an audit committee in accordance with JSE rules and zero otherwise
t	years 1995, 1999, 2000, 2001
$t+1$	years 1996, 2000, 2001, 2002.

Earnings are decomposed into three variables: CFO, non-discretionary accruals (NDAC), and discretionary accruals (DAC). DAC is the variable of interest and if the

type of earnings management is efficient, the coefficient (b_3) will be positive. Otherwise, it will be either zero or negative. Other variables relate to firm size, ownership structure, and governance practices and they are included as control variables.

Hypotheses 1b–1g imply that the DAC coefficient (b_3) is influenced by the hypothesized variables (family ownership, proportion of institutional investors, etc.). Therefore, to test Hypotheses 1b–1g, we use the following research model, which allows the DAC coefficient to vary:³

$$\begin{aligned} X_{it} = & \beta_1 + \beta_2 \text{CFO}_{it} + \beta_3 \text{NDAC}_{it} + \beta_3 \text{DAC}_{it} + \beta_4 \text{DAC}_{it} \times \text{DFAM}_{it} \\ & + \beta_5 \text{DAC}_{it} \times \text{INST}_{it} + \beta_6 \text{DAC}_{it} \times \text{DSIZE}_{it} + \beta_7 \text{DAC}_{it} \times \text{AUDIT}_{it} \\ & + \beta_8 \text{DAC}_{it} \times \text{BOD}_{it} + \beta_9 \text{DAC}_{it} \times \text{AUDCOM}_{it} + \beta_{10} \text{DFAM}_{it} \\ & + \beta_{11} \text{INST}_{it} + \beta_{12} \text{DSIZE}_{it} + \beta_{13} \text{AUDIT}_{it} + \beta_{14} \text{BOD}_{it} \\ & + \beta_{15} \text{AUDCOM}_{it} + \beta_{16} D99 + \beta_{17} D00 + \beta_{18} D01 + e \end{aligned} \quad (1b)$$

Expectation: Hypothesis 1b: $\beta_4 > 0$, Hypothesis 1c: $\beta_5 > 0$, Hypothesis 1d: $\beta_6 > 0$, Hypothesis 1e: $\beta_7 > 0$, Hypothesis 1f: $\beta_8 > 0$, Hypothesis 1g: $\beta_9 > 0$.

As explained in hypothesis development, the effect of discretionary accruals on future profitability is moderated by DFAM, INST, DSIZE, AUDIT, BOD, and AUDCOM. So, in the research model (1b) each of six variables interacts with DAC. We use interacting variables because the resulting coefficient will show the incremental effect of each variable on the relationship between discretionary accruals and future profitability. For example, if DFAM = zero, then the effect of the discretionary accruals on future profitability is β_3 , and if DFAM = one, then the effect of discretionary accruals on future profitability is $\beta_3 + \beta_4$. β_4 is the difference between DFAM = zero and DFAM = one, which is the interacting variables coefficient.

Each of those six variables is also included as an independent variable to control the possibility that each variable has a direct influence on future profitability. For example, Bushee (2000) finds that the proportion of firm value reflected in future earnings is positively associated with institutional investors. This indicates that a large capital investment in a firm will force institutional investors to monitor management behavior to be sure they pursue long-run profitability. Year dummy is used to control for the variation of future profitability over time.

To check whether there may be multicollinearity problem among the independent variables, Variance Inflation Factor (VIF) is computed for each independent variable. Generally, multicollinearity problems exist if any VIFs exceed 10.

3.3. Definition of variables

3.3.1. Future profitability

We measure future profitability by each of following variables:

1. CFO_{t+1} = one-year-ahead cash flows from operation
2. NDNI_{t+1} = one-year-ahead non-discretionary net income ($\text{EARN}_{t+1} - \text{DAC}_{t+1}$)
3. ΔEARN_{t+1} = one-year-ahead change in earnings ($\text{EARN}_{t+1} - \text{EARN}_t$)

³ This approach has been extensively employed in the ERM literature (see for example Ghosh & Moon, 2005) that investigates factors affecting ERC.

Table 1
Correlation between discretionary accruals in year t and year $t+1$

	DAC _{<i>t</i>}
DAC _{<i>t+1</i>}	0.382
	0.0000^a

Number in bold is the p value of the coefficient correlation.

t = years 1995, 1999, 2000, 2001

$t+1$ = years 1996, 2000, 2001, 2002.

^a Significant at 1%.

All variables are scaled by beginning total assets.

Our measures are based on previous research (Subramanyam, 1996; Krishnan, 2003), which use three measures of future profitability (EARN, CFO, and NDNI). We do not include EARN, but use ΔEARN_{t+1} instead because we believe EARN has inherent weaknesses. Earnings has discretionary accruals in it, so if there is a positive and significant relationship between discretionary accruals in year t and earnings in year $t+1$, it could be due to management creating another discretionary accruals in year $t+1$ and not an indication of efficient earnings management. As Table 1 shows, there is a positive and significant correlation between discretionary accruals in year t and year $t+1$, which supports our opinion.

As a substitute for traditional earnings measures, we use change in earnings instead. Because earnings and discretionary accruals tend to have a stationary nature, the use of change in earnings will control for the stationary nature of discretionary accruals. Further, we also use cash flows from operation and non-discretionary net income. Those two measures do not have discretionary-accrual component, so they do not have the inherent problems of earnings. Among these three measures, we believe NDNI and CFO are the most reliable because they do not include any discretionary-accrual components.

3.3.2. Earnings management

Total accruals (ACCR) is calculated as the difference between earnings and cash flows from operation ($\text{ACCR} = \text{EARN} - \text{CFO}$). Earnings (EARN) is defined as net income before extraordinary items and cash flows from operation (CFO) is net cash flows from operating activities reported in the Statement of Cash Flows.

Based on the adjusted R^2 , one of following models is selected to decompose total accruals into discretionary and non-discretionary-accrual components:

1. Jones (1991):

$$\text{ACCR}_{it} = \alpha_0 + \alpha_1 \cdot \Delta\text{REV}_{it} + \alpha_2 \text{PPE}_{it} + e_{it}$$

where:

ACCR total accruals

ΔREV change in revenue from year $t-1$ to year t ($\text{REV}_t - \text{REV}_{t-1}$)

PPE gross property, plant, and equipment in year t .

All variables are scaled by beginning total assets.

2. Dechow, Sloan, and Sweeney (1995):

$$ACCR_{it} = \alpha_0 + \alpha_1 [\Delta REV_{it} - \Delta REC_{it}] + \alpha_2 PPE_{it} + e_{it}$$

where:

ΔREC = change in net accounts receivables from year $t-1$ to year t ($REC_t - REC_{t-1}$).

All variables are scaled by beginning total assets.

3. Kasznik (1999):

$$ACCR_{it} = \alpha_0 + \alpha_1 [\Delta REV_{it} - \Delta REC_{it}] + \alpha_2 PPE_{it} + \alpha_3 \Delta CFO_{it} + e_{it}$$

where:

ΔCFO = change in cash flows from operation from year $t-1$ to year t ($CFO_t - CFO_{t-1}$).

All variables are scaled by beginning total assets.

4. Dechow, Richardson, and Tuna (2002):

$$ACCR_{it} = \alpha_0 + \alpha_1 [\Delta REV_{it} - (1-k)\Delta REC_{it}] + \alpha_2 PPE_{it} + \alpha_3 ACCR_{it-1} + \alpha_4 \Delta REV_{it+1} + e_{it}$$

where:

K = slope coefficient from regression ΔREC on ΔREV

$ACCR_{t-1}$ = total accruals in $t-1$ scaled by total assets in $t-2$

ΔREV_{t+1} = change in revenue from year t to year $t+1$, scaled by revenue in year t ($(REV_{t+1} - REV_t) / REV_t$).

Other variables are scaled by beginning total assets.

Nondiscretionary accruals (NDAC) are fitted values from the above models and discretionary accruals (DAC) are defined as the residuals.

Following Subramanyam (1996), we use a cross-sectional method, where each model is estimated separately for each combination of calendar year and firm group (manufacturing and non-manufacturing). Those models can be estimated separately from past time series for each firm, but the research period is not long enough (1995–1996 and 1999–2002), so this method is not used.

3.3.3. Family ownership and business groups

Following Arifin (2003), family ownership is defined as all firms whose listed ownership (ownership $> 50\%$) does not include the state, financial institutions, or the public (individuals whose ownership is not listed). Samples are classified as firms with high family ownership (proportion of family ownership $> 50\%$) and low family ownership (proportion of family ownership $\leq 50\%$).⁴

⁴ We employ a 50% cutoff, because in general ownership $> 50\%$ entitles the investors to exercise control over the company, including over earnings management activity. Accounting standards regarding equity investment also stipulate this cutoff to indicate the existence of control.

Sample firms are further classified into belonging to business groups and not belonging to business groups. For this purpose, we use information on Conglomeration Indonesia (1997) and Top Companies and Big Groups in Indonesia (1995). These books provide a list of business groups in Indonesia along with firms belonging to each group.

We hypothesize that firms in the category “high family ownership and no business groups” are likely to engage in more efficient earnings management than the other three categories (high family ownership and belonging to business groups, low family ownership and not belonging to business groups, low family ownership and belonging to business groups). To test the hypothesis, we make a dummy variable taking the value of one for firms with high family ownership and no business groups and zero for otherwise.

3.3.4. Institutional ownership

Institutional ownership is ownership by financial institutions, such as insurance companies, banks, pensions, mutual funds, and investment banks (Koh, 2003).

3.3.5. Firm size

The natural logarithm of end-of-year market capitalization is used to measure firm size. We rank samples based on end-of-year market capitalization, and divided samples equally. After that, we make a dummy variable where one is used for firms in the upper half and zero otherwise.

3.3.6. Corporate-governance practices

3.3.6.1. Auditor's size⁵ Auditor's size is used to measure audit quality, where one for firms audited by Big 4 auditors (high audit quality) and zero for firms audited by non-Big 4 auditors (low audit quality).

3.3.6.2. Independent board The proportion of independent board members is calculated from the number of independent commissioners divided by the number of commissioners' on the board.

3.3.6.3. The existence of an audit committee This variable is measured as a dummy variable, where one for firms with an audit committee and zero otherwise.

4. Sample selection

The sample for the study is comprised of all firms listed on the Jakarta Stock Exchange (JSE), excluding firms in financial, real estate, and telecommunication industries. The

⁵ In our research period, 1995–2002, there was a change in the number of big accounting firms. From years 1995–1998, there were six big accounting firms (Big 6), in years 1998–2002 there were five (Big 5), and since 2002 there have been four (Big 4). Our definition follows the change in the number of big accounting firms, however, for simplicity, in this study we use the term “Big 4” for all big accounting firms during our research period.

Table 2

Sample selection procedure

Total number of firms listed in the JSE as of December 31, 1994	239
Firms in financial, real estate, and telecommunication industries	(74)
Delisting during period 1996–2002	(15)
Preferred stock	(3)
Firms with non-December 31 fiscal year	(1)
Incomplete data	(2)
Total sample firms	144

sample period is from 1995–1996, and 1999–2002. The following criteria are applied in selecting firms for the sample:

1. Listed in JSE from 1994–2002.
2. The data on the variables used are available for each year in the sample period.
3. Financial, real estate, and telecommunication companies are excluded.
4. Firms have a December 31 fiscal year-end.
5. Stock listed is common stock.

Table 3

Evaluation of earnings-management-measurement models

Panel A: adjusted R^2

Measurement model	Adjusted R^2						Mean
	1995	1996	1999	2000	2001	2002	
Jones (1991)	0.2005	0.0900	0.0300	0.0265	0.1520	0.0380	0.0895
Dechow et al. (1995)	0.1845	0.0625	0.0250	0.0250	0.1240	0.0345	0.0759
Kasznik (1999)	0.5220	0.5290	0.4145	0.1650	0.3790	0.1030	0.3521
Dechow et al. (2002)	0.2455	0.2000	0.0920	0.0480	0.3000		0.1771

Panel B: predicted sign

Predicted sign	% Positive
Jones (1991)	
$\Delta \text{REV} (+)$	91.67%
$\text{PPE} (-)$	16.67%
Dechow et al. (1995)	
$\Delta \text{REV} - \Delta \text{REC} (+)$	75.00%
$\text{PPE} (-)$	16.67%
Kasznik (1999)	
$\Delta \text{REV} - \Delta \text{REC} (+)$	83.33%
$\text{PPE} (-)$	25.00%
$\Delta \text{CFO} (-)$	0.00%
Dechow et al. (2002)	
$\Delta \text{REV} - (1-k)\Delta \text{REC} (+)$	70.00%
$\text{PPE} (-)$	10.00%
$\Delta \text{CFO} - 1 (-)$	60.00%
$\Delta \text{REV}_{t-1} (+)$	60.00%

Table 4
Descriptive statistics

	Mean	Median	Maximum	Minimum	Standard deviation
CFO _{<i>t+1</i>}	0.0756	0.0662	0.4307	−0.2905	0.1061
NDNI _{<i>t+1</i>}	0.0121	0.0114	0.3220	−0.3312	0.1052
ΔEARN _{<i>t+1</i>}	−0.0120	0.0024	0.8395	−0.9006	0.2565
CFO	0.0740	0.0644	0.5277	−0.3210	0.1257
NDAC	−0.0527	−0.0583	0.2986	−0.4116	0.1087
DAC	−0.0001	0.0007	0.3968	−0.3966	0.1158
INST	0.0659	0.0000	0.8423	0.0000	0.1420
BOD	0.0768	0.0000	0.7500	0.0000	0.1526
		Proportion Dummy = 1			Proportion Dummy = 0
DFAM		20.31%			79.69%
DSIZE		50.00%			50.00%
AUDIT		88.02%			11.98%
AUDCOM		11.46%			88.54%

CFO_{*t+1*} = cash flows from operation one-year-ahead, NDNI_{*t+1*} = non-discretionary net income one-year-ahead, ΔEARN_{*t+1*} = change in earnings one-year-ahead, CFO = cash flows from operation, NDAC = non-discretionary accruals, DAC = discretionary accruals, DFAM = one if firms have high family ownership and do not belong to business groups and zero otherwise, INST = institutional ownership, DSIZE = one if firm is in the 50% highest market capitalization and zero otherwise, AUDIT = one if firm is audited by Big 4 auditors and zero otherwise, BOD = proportion of independent board, AUDCOM = one if firms have audit committee and zero otherwise

The sample selection procedure is summarized in Table 2. After applying the above criteria, there are 144 firms in our sample.

5. Results

5.1. Evaluation of earnings-management-measurement models

To determine which model to use in our main analysis, we evaluate the explanatory power (adjusted R^2) of each model. The results for each model (Jones, 1991; Dechow et al., 1995; Kasznik, 1999; Dechow et al., 2002) are presented in Table 3. Because Kasznik (1999) shows the highest adjusted R^2 , we employ this model in our main analysis and the others in sensitivity analysis.

Table 5
Family ownership and business groups

		Business group		
		Part of business group	Non-business group	Total
Family	>50%	48.96%	20.31%	69.27%
Ownership	<50%	27.08%	3.65%	30.73%
Total		76.04%	23.96%	100.00%

Table 6
Correlation

	CFO	NDNI	ΔLAPN	CFO	NDAC	DAC	DFAM	INST	DSIZE	AUDIT	BOD	AUDCOM
CFO	1.0000	0.6436*	0.0380	0.3790	0.0130**	0.0130**	0.1810	(0.0610)	0.1270	0.1250	(0.0990)	(0.1040)
NDNI	0.6090	1.0000	0.3790	0.0000***	0.9590	0.0130**	0.0000***	0.1570	0.0030***	0.0040***	0.0220**	0.0160**
ΔLAPN	0.0380	0.0680	1.0000	0.0490***	0.0720*	0.0540*	0.0110**	0.2060*	0.3300	0.0900*	0.0010***	0.0460***
CFO	0.4940	0.1340	0.0360	1.0000	0.6570	0.3140	0.2520	0.4540	0.6280	0.5990	0.1450	0.9390
NDNI	0.3770	0.3200	0.0360	1.0000	0.0870	0.0870	0.1240	0.0080	0.1690	0.0490	0.0100	0.0220
ΔLAPN	0.0000***	0.0000***	1.0000	0.0000***	0.0450**	0.0450**	0.0040***	0.8490	0.0000***	0.2610	0.8110	0.6050
CFO	0.0160	0.0410	0.0890	0.4250	1.0000	(0.1200)	(0.0790)	(0.0080)	(0.0430)	(0.0560)	(0.0790)	(0.0360)
NDNI	0.0707	0.3400	0.1720	0.0000***	1.0000	0.0050**	0.0670*	0.8500	0.3230	0.1970	0.0680*	0.4090
DAC	0.0640	0.0600	0.0140	(0.1110)	(0.1410)	1.0000	0.1990	0.0030	0.1180	0.0580	0.0020	0.0190
DFAM	0.0290**	0.1650	0.7480	0.0100***	0.0010***	0.0000***	0.0000***	0.9360	0.0060***	0.1810	0.9560	0.6690
INST	0.1370	0.0880	0.0570	0.1080	(0.0540)	0.2290	1.0000	(0.1490)	(0.1840)	(0.0080)	0.0210	(0.0010)
DSIZE	0.0010***	0.0430**	0.1880	0.0130**	0.2140	0.0000***	0.0000***	0.0010***	0.0000***	0.8620	0.6310	0.9770
AUDIT	(0.0890)	(0.0750)	0.0060	0.0420	(0.1060)	(0.0180)	(0.1760)	1.0000	0.1030	(0.0020)	0.0850	0.0910
BOD	0.0390**	0.0840*	0.8970	0.3340	0.0200**	0.6710	0.0000***	0.0000***	0.0170**	0.9600	0.0500**	0.0350**
AUDCOM	0.1580	0.0380	0.0220	0.1750	(0.0260)	0.0850	(0.1850)	0.0580	1.0000	0.1380	(0.0080)	(0.0520)
CFO	0.0000***	0.3830	0.6050	0.0000***	0.5500	0.0480**	0.0000***	0.1780	0.0000***	0.0010***	0.8570	0.2320
NDNI	0.1330	0.0640	0.0240	0.0710	0.0590	0.0490	(0.0080)	0.0250	0.1500	1.0000	(0.1490)	(0.0700)
ΔLAPN	0.0020***	0.1400	0.5860	0.1000*	0.1700	0.2550	0.8620	0.5570	0.0000***	0.0000***	0.0010***	0.1080
CFO	(0.0890)	0.1510	(0.0820)	(0.0190)	0.0160	0.0160	0.0180	0.0910	(0.0280)	(0.1460)	1.0000	0.6880
NDNI	0.0400	0.0000***	0.0580*	0.6600	0.0560*	0.7170	0.6840	0.0350**	0.5180	0.0010***	0.0010***	0.0000***
DAC	(0.0970)	(0.0910)	(0.0280)	(0.0290)	(0.0310)	0.0350	(0.0010)	0.0900	(0.0530)	(0.0700)	0.6830	1.0000
DFAM	0.0250**	0.0340**	0.5190	0.5080	0.4690	0.4170	0.9770	0.0370**	0.2220	0.1080	0.0000***	0.0000***

CFO = cash flows from operation one-year-ahead, NDNI = non-discretionary net income one-year-ahead, ΔEARN_t = change in earnings one-year-ahead, CFO = cash flows from operation, NDAC = non-discretionary accruals, DAC = discretionary accruals, DFAM = one if firms have high family ownership and not belonging to business groups and zero otherwise, INST = institutional ownership, DSIZE = one if firm is in the 50% highest market capitalization and zero otherwise, AUDIT = one if firm is audited by Big 4 auditors and zero otherwise, BOD = proportion of independent board, AUDCOM = one if firms have audit committee and zero otherwise

***Significant at 1%, **Significant at 5%, *Significant at 10% (two-tail)

Numbers at upper diagonal is Pearson Correlation and at lower diagonal is Spearman Correlation

Numbers in bold are the *p* values of the coefficient correlation

In panel B of Table 3 we present the percentage of the coefficient for a predicted sign for each model. The Kasznik model has a relatively greater proportion of coefficients that are of a predicted sign.

5.2. *Earnings management: efficient or opportunistic?*

Descriptive statistics and their correlation are shown in Tables 4–6. On average, the sample firms have positive future cash flow from operation and positive future non-discretionary net income (CFO_{t+1} and $NDNI_{t+1}$). But from $\Delta EARN_{t+1}$, we can see that, on average, the sample firms have declining earnings. The majority of our sample firms are audited by big accounting firms (88.02%) but only 11.46% have an audit committee in compliance with the JSE rule.

Only 20.31% of our sample is in the category “high family ownership and not belonging to business groups”. Further examination of family ownership and business groups is presented in Table 5. About 76% of our sample firms belong to business groups and 24% are not members of any business groups. Consistent with Arifin (2003), the majority of our sample is controlled by family (69%).

CFO has a negative and significant correlation with NDAC and DAC, which is consistent with the smoothing nature of accruals. Future cash flows has a positive and significant correlation with firm size, which means that large firms have high cash flows from operation.

DFAM has a positive and significant correlation with CFO_{t+1} and $NDNI_{t+1}$, which indicates that firms with high family ownership that have no business groups have a higher future profitability than other firms. A positive and significant correlation between AUDIT and DSIZE shows that large firms tend to be audited by Big 4 auditors. A positive and significant correlation between BOD and AUDCOM shows that firms with a high proportion of independent board members tend to have audit committees. A majority of our sample firms are non-DFAM firms and audited by Big 4 auditors.

The results from the regression of research model (1a) are presented in Table 7. Hypothesis 1a is supported (significant at the 1% level). The DAC coefficient is positive if we use cash flows from operation and non-discretionary net income and it is negative if we use change in earnings as a dependent variable. This result indicates that the type of earnings management tends to be efficient contracting because two out of three DAC coefficients are positive. This is not consistent with the common view that earnings management in Indonesia is opportunistic.

Subramanyam (1996), Gul et al. (2000), and Krishnan (2003) also find evidence that earnings management of listed firms in the United States is also efficient. But Burgstahler and Dichev (1997) and Balsam et al. (2002) find opposite evidence. They conclude that earnings management is opportunistic.

5.3. *Ownership structure, firm size, and corporate-governance practices*

Results from the regression of research model (1b) are shown in Table 8. The VIFs for all independent variables are below 10, indicating that multicollinearity is not a problem. Hypothesis 1b is accepted and this indicates that earnings management in firms with high

family ownership that do not belong to business groups is more efficient than that in other firms.

For panels A and B, Hypothesis 1c is not supported (β_5 is positive but insignificant). This result suggests that institutional ownership does not significantly induce management to adopt efficient earnings management. As shown in descriptive statistics in Table 3, the average institutional ownership in our sample is relatively small and this could constrain the ability of institutional investors to monitor management effectively. Hypothesis 1d is also not supported (β_6 is positive but insignificant). This evidence could suggest that large firms do not use efficient earnings management significantly more than small firms.

Hypothesis 1e is not supported, which show that firms audited by the Big 4 do not use efficient earnings management more than firms audited by non-Big 4. This may suggest that size of audit firms may not be a good proxy for audit quality.

Hypothesis 1f is also not supported. Two explanations for this result are: first, independent boards have been shown to effectively monitor management in part because

Table 7

Regression of future profitability on discretionary accruals, other earnings component, and control variables

Variable	Expected sign	CFO		NDNI _{<i>t-1</i>}		ΔEARN_{t+1}	
		Coefficient	<i>p</i> value	Coefficient	<i>p</i> value	Coefficient	<i>p</i> value
<i>C</i>		0.0224	0.1181	0.0212	0.0152	-0.0571	0.1508
CFO	+	0.4945	0.0000***	0.7191	0.0000***	0.0759	0.2563
NDAC	+	0.4015	0.0000***	0.3019	0.0000***	0.1626	0.1754
DAC	+/-	0.1365	0.0003***	0.1373	0.0000***	-0.2536	0.0489**
DFAM	+	0.0218	0.0239**	0.0023	0.6242	0.0516	0.0353**
INST	+	-0.0374	0.8699	-0.0299	0.9240	0.0713	0.1900
DSIZE	+	0.0047	0.2937	0.0007	0.4460	0.0525	0.0094***
AUDIT	+	0.0227	0.0266**	0.0084	0.1303	0.0220	0.2798
BOD	+	0.0160	0.3563	-0.0457	0.8944	-0.0208	0.5630
AUDCOM	+	-0.0283	0.9651	-0.0128	0.8540	0.0788	0.0454**
<i>D99</i>		0.0047	0.7056	-0.1495	0.0000***	-0.1157	0.0002***
<i>D00</i>		0.0417	0.0145*	-0.0516	0.0000***	0.1208	0.0034***
<i>D01</i>		0.0150	0.4039	0.0076	0.5657	-0.0817	0.1009
<i>N</i>		553		558		550	
Adjusted <i>R</i> ²		0.2497		0.6848		0.0966	
<i>F</i> -statistic		16.3069		101.8418		5.8917	
<i>p</i> value (<i>F</i> -statistic)		0.0000		0.0000		0.0000	

$$\Delta \text{EARN}_{t+1} = b_0 + b_1 \text{CFO}_{it} + b_2 \text{NDAC}_{it} + b_3 \text{DAC}_{it} + b_4 \text{DFAM}_{it} + b_5 \text{INST}_{it} + b_6 \text{DSIZE}_{it} + b_7 \text{AUDIT}_{it} + b_8 \text{BOD}_{it} + b_9 \text{AUDCOM}_{it} + b_{10} D99_{it} + b_{11} D00_{it} + b_{12} D01_{it} + e$$

Dependent variable: CFO = cash flows from operation one-year-ahead, NDNI_{*t-1*} = non-discretionary net income one-year-ahead, ΔEARN_{t+1} = change in earnings one-year-ahead.

Independent variables: CFO = cash flows from operation, NDAC = non-discretionary accruals, DAC = discretionary accruals, DFAM = one if firms have high family ownership and do not belong to business groups and zero otherwise, INST = institutional ownership, DSIZE = one if firm is in the 50th highest market capitalization and zero otherwise, AUDIT = one if firm is audited by Big 4 auditors and zero otherwise, BOD = proportion of independent board, AUDCOM = one if firms have audit committee and zero otherwise.

N after excluding outliers with criteria ± 3 times standard deviation.

***Significant at 1%, **significant at 5%, *significant at 10% (two-tail).

they have only been operating for a short period (2 years, from 2001 until 2002). Second, publicly listed firms appoint independent boards only to comply with regulations; therefore, independent boards are not utilized as a monitoring mechanism.

Hypothesis 1g, which states that the effect of discretionary accruals on future profitability is higher for firms with audit committees than for firms without audit committees, is not supported in panels A and B of Table 8. The explanations for this result

Table 8
Regression of future profitability on discretionary accruals, discretionary accruals-ownership structure, firm size, and corporate-governance practices interaction, other earnings component, and control variables

Variable	Expected sign	Panel A: CFO _{t+1}		Panel B: NDNI _{t+1}		Panel C: ΔEARN _{t+1}	
		Coefficient	p value	Coefficient	p value	Coefficient	p value
C		0.0251	0.0817*	0.0226	0.0234	0.055*	0.1625
CFO	+	0.4839	0.0000***	0.7125	0.0000***	0.0668	0.2711
NDAC	+	0.3970	0.0000***	0.2997	0.0000***	0.1893	0.1335
DAC	+/-	0.1635	0.1190	0.1276	0.0660*	0.3205	0.2653
DAC*DFAM	+	0.1556	0.0556*	0.1071	0.0317**	0.6365	0.0088***
DAC*INST	+	0.1209	0.3256	0.0924	0.2547	-0.3609	0.6990
DAC*DSIZE	+	0.0481	0.2620	0.0298	0.2661	0.0045	0.4920
DAC*AUDIT	+	-0.0910	0.8119	-0.0342	0.6915	-0.1563	0.7220
DAC*BOD	+	0.0294	0.453	0.1025	0.2927	0.6298	0.2447
DAC*AUDCOM	+	-0.1424	0.8437	-0.1131	0.8541	0.7678	0.0475**
DFAM	+	0.0171	0.0622*	0.0055	0.7741	0.0352	0.1179
INST	+	-0.0403	0.8878	-0.0313	0.9511	0.0993	0.1084
DSIZE	+	0.0058	0.2527	0.0014	0.4041	0.0572	0.0045***
AUDIT	+	0.0200	0.0424**	0.0069	0.2102	0.0148	0.3466
BOD	+	0.0282	0.2651	-0.037	0.8343	-0.0558	0.3336
AUDCOM	+	-0.0276	0.9632	-0.0125	0.8594	0.0791	0.0396
D99		0.0047	0.7079	-0.1493	0.0000***	-0.1172	0.0002***
D00		0.0387	0.0215**	-0.0534	0.0000***	0.1231	0.0027***
D01		0.0111	0.5455	0.0050	0.7254	-0.0721	0.1638
N		553		558		551	
Adjusted R ²		0.2492		0.6847		0.4473	
F-statistic		11.1789		68.1855		25.7294	
p value (F-statistic)		0.0000		0.0000		0.0000	

$$X_{it+1} = \beta_0 + \beta_1 \text{CFO}_{it} + \beta_2 \text{NDAC}_{it} + \beta_3 \text{DAC}_{it} + \beta_4 \text{DAC}_{it} \times \text{DFAM}_{it} + \beta_5 \text{DAC}_{it} \times \text{INST}_{it} + \beta_6 \text{DAC}_{it} \times \text{DSIZE}_{it} + \beta_7 \text{DAC}_{it} \times \text{AUDIT}_{it} + \beta_8 \text{DAC}_{it} \times \text{BOD}_{it} + \beta_9 \text{DAC}_{it} \times \text{AUDCOM}_{it} + \beta_{10} \text{DFAM}_{it} + \beta_{11} \text{INST}_{it} + \beta_{12} \text{DSIZE}_{it} + \beta_{13} \text{AUDIT}_{it} + \beta_{14} \text{BOD}_{it} + \beta_{15} \text{AUDCOM}_{it} + \beta_{16} \text{D99}_{it} + \beta_{17} \text{D00}_{it} + \beta_{18} \text{D01}_{it} + e$$

Dependent variable: CFO_{t+1} = cash flows from operation one-year-ahead, NDNI_{t+1} = non-discretionary net income one-year-ahead, ΔEARN_{t+1} = change in earnings one-year-ahead

Independent variables: CFO = cash flows from operation, NDAC = non-discretionary accruals, DAC = discretionary accruals, DFAM = one if firms have high family ownership and do not belong to business groups and zero otherwise, INST = institutional ownership, DSIZE = one if firm is in the 50th highest market capitalization and zero otherwise, AUDIT = one if firm is audited by Big 4 auditors and zero otherwise, BOD = proportion of independent board, AUDCOM = one if firms have audit committee and zero otherwise.

N after excluding outliers with criteria ± 3 times standard deviation.

***Significant at 1%, **significant at 5%, *significant at 10% (two-tail).

are the same as for the independent boards. But in panel C, this hypothesis is supported and significant. Control variables are not consistently significant over the three alternative tests.

5.4. Sensitivity analysis

To test the sensitivity of our main analysis results, we measure discretionary accruals using the other three alternative models [Jones (1991), Dechow et al. (1995), and Dechow et al. (2002)]. If we use change in earnings, discretionary accruals have a negative effect on future profitability (although it is only significant if we use Dechow et al. (2002) to measure discretionary accruals). Further, consistent with our main results, if we use cash flows from operation and non-discretionary net income, we find that discretionary accruals have a positive and significant effect. These results suggest that the evidence regarding earnings management in the JSE tends to be efficient. Hypothesis 1b is also supported, which is similar to our main analysis results. This indicates that earnings management in firms with high family ownership and no business groups is more efficient than in other firm ownership.

To obtain a better measure of discretionary accruals, as suggested in Bernard and Skinner (1996), Collins and Hribar (2002), and used by Xie (2001), discretionary accruals is estimated after controlling non-articulation events (such as merger, acquisition, or divestitures). Thus, observations with merger, acquisition, or divestitures are deleted.⁶ This sensitivity test also shows qualitatively similar results with our main results.

The effectiveness of institutional investors' role in the monitoring process depends on the level of control they have over the company. These roles will be restricted if another party holds a majority ownership (such as a founding family). We employ interacting variables between institutional ownership and a dummy variable for majority family ownership (one if the firm has a majority family ownership and zero otherwise) to test this effect. This does not change the results in our main analysis.

We perform a sensitivity test using a dummy variable for firm size. We use a cutoff 40%:60%, where 40% of the sample firms with the highest market capitalization are large firms and 60% of the sample firms with the lowest market capitalization are small firms. These results also do not differ qualitatively from the results in our main analysis.

The research period for our main analysis is the non-crises period 1995 through 1996, 1999 through 2002. Years 1997–1998 are excluded because those are crises periods. To examine the test results in a crisis period only, we repeat the test using observations in those years. These results are similar to those from the non-crisis period, where the evidence regarding earnings management tends to confirm the use of efficient earnings management. Earnings management in firms with high family ownership and no business groups is more efficient than that of other firms.

The JSE rule requiring publicly-owned companies to appoint independent boards and to establish audit committees was released in June 2000 and effective as of December 31, 2001, at the latest. We repeat our test using 2001–2002 data only. BOD and AUDCOM are

⁶ Number of observations with merger, acquisition, and divestitures is 144 or 16.67% (144/864) of total observations.

consistently not significant. The results indicate that independent boards and audit committees do not necessarily lead to more efficient earnings management.

In our research model, we use several dummy variables (DFAM, AUDIT, DSIZE, and AUDCOM). There is an inherent problem in using several dummy variables in one model. It increases the number of cells (the number of cells is n^k , where n is the number of dummy variables) and thus decreases the average number of observations in each cell. Accordingly, the reliability of the results is questionable. To overcome this problem, we break down research model (1b) into several sub-models, with only one dummy variable in each. So, we have the following model:

$$X_{it+1} = \beta_{k0} + \beta_{k1}CFO_{it} + \beta_{k2}NDAC_{it} + \beta_{k3}DAC_{it} + \beta_{k4}DAC_{it} \times Dk_{it} + \beta_{k5}Dk_{it} + \beta_{k6}D99_{it} + \beta_{k7}D00_{it} + \beta_{k8}D01_{it} + e \quad (1c)$$

Expectation: $\beta_{k4} > 0$

where: Dk = DFAM for $k = 1$, DSIZE for $k = 2$, AUDIT for $k = 3$, AUDCOM for $k = 4$.

The results of the above research model are qualitatively similar to our main analysis results.

6. Conclusion and suggestions for further research

6.1. Conclusion

Our study finds that the type of earnings management favored by publicly listed firms on the JSE tends to be efficient contracting. This result is not consistent with public perception that these firms engage in opportunistic earnings management. We also find evidence that earnings management in firms with high family ownership that do not belong to business groups is more efficient than in firms with a different ownership structure. In contrast, we do not find significant evidence that larger firms, firms audited by the Big 4, firms with a higher proportion of independent boards, and firms with audit committees engage in efficient earnings management.

6.2. Implications

6.2.1. For regulatory bodies (Indonesian Capital Market Supervisory Agency and Jakarta Stock Exchange)

We find sufficient evidence to suggest that earnings management in firms with high family ownership that do not belong to business groups is efficient. This suggests that control by a founding family seems not to harm minority shareholders, if those firms do not belong to business groups. Given that a majority of publicly listed firms belong to business groups, our finding could be interpreted by regulatory bodies as a need to place additional monitoring on those companies.

We find that the effect of future profitability is lower (although insignificant) on firms audited by Big 4 auditors on firms audited by non-Big 4 auditors. It means that big audit firms do not necessarily restrict opportunistic earnings management. This finding could

suggest that audit firm size is not a good proxy for audit quality in Indonesia. Another proxy for audit quality is audit fee and audit hours. But these data are not available on annual reports. The Indonesian Capital Market Supervisory Agency could issue regulations that require publicly listed firms to disclose this information on their annual report.

The existence of independent boards and audit committees do not significantly affect a company's pursuit of more efficient earnings management. There are several possible reasons for these results. First, public companies only appoint independent boards and establish audit committees to comply with regulations. They do not use those boards to monitor management. Regulators need to determine the best ways, not only to enforce the rules, but also to disseminate information about the advantage of having good corporate-governance practices. Second, the minimum requirement for independent board membership is 30%. This proportion may not be high enough to exert significant influence on board. If this is true, then regulators should consider increasing the minimum proportion requirement (maybe >50%). Third, the regulations about independent boards and audit committees were only started in 2001. Hence, the short period for which data are available for our study may account for our negative results.

6.2.2. For investors

Based on our results, investors can rely more on earnings figures reported by companies with high family ownership that do not belong to business groups than on other companies. Investors should also recognize that even though publicly listed companies are audited by big accounting firms, there is still a strong possibility of earnings management.

6.3. Limitations of the study

1. The ability of the Jones model and modified Jones model to accurately decompose accruals into non-discretionary and discretionary components is still questionable. Accordingly, there is a possibility of misclassification of non-discretionary and discretionary accruals. If some components of non-discretionary accruals are mistakenly classified as discretionary accruals, then this may explain the positive relation between discretionary accruals and some measures of future profitability.
2. Due to a lack of data on corporate-governance indexes, we employ only audit quality, independent board, and audit committee to measure corporate-governance practices in publicly listed firms. Nowadays, there is no institution in Indonesia that has developed a corporate-governance index for all publicly listed firms in the JSE. The only index available is the Corporate Governance Performance Index (CGPI), which was issued by IICG. But, most listed firms refused to participate in the survey. Only the indexes for the top-10 firms were published in SWA magazine while the indexes for the other participating firms are kept confidential.
3. Public firms in Indonesia have been required to appoint independent boards and establish audit committees only since 2001. Our research period only goes up to 2002. Therefore, results on the influence of independent boards and audit committees on earnings-

management type, may stem from this short period of data. In addition, the measures do not indicate the activities of the independent boards and audit committees.

4. The size of an accounting firm may not be a good proxy for audit quality in Indonesia.

6.4. Suggestions for further research

1. Future research could develop a better discretionary-accrual model. It could develop a particular model for each industry, so different in industry characteristics which influence discretionary accruals could be included in the model. Also by developing a particular model for each industry, further research could identify different earnings-management patterns in each industry.
2. Future study could develop an instrument to compute corporate-governance indexes that could be applied for all publicly listed firms in Indonesia. For example, the Indonesian Institute for Corporate Directorship (IICD) is developing a corporate-governance index based on publicly available data.
3. Further research could concentrate on boards of directors' and audit committees' influence on earnings management over a longer period. Other measures of these variables could also be developed, such as their background and their activities as reported in the annual report.
4. Identify another proxy for audit quality, such as audit failures (Dang, 2004) and audit fees.
5. In our study, we use cash flows from operation, non-discretionary net income, and change in earnings as measures for future profitability. Our research is not intended to identify which variable is the best measure. Future research could try to identify which one is the best or identify another variable as a measure for future profitability.

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Corporate governance and incidences of listing suspension by the JSE Securities Exchange of South Africa: An empirical analysis

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Abstract

We examine the association between corporate governance structures and incidences of listing suspension from the JSE Securities Exchange of South Africa. Using a matched-pairs research design, we compare 81 firms suspended between 1999 and 2005 to an equal number of control firms matched in terms of time, size and industry. Employing a conditional logistic model, we find that the likelihood of suspension is higher in firms with a smaller proportion of non-executive directors, without an audit committee, and with greater block-share ownership and higher gearing (i.e. leverage). Further analysis splitting block-share ownership into institutional and non-institutional investors provides mixed results. While we find a positive association between suspension and non-institutional investors, we observe no association with institutional investors. No association is detected for board size, role duality, directors' share ownership, auditor quality and return on assets. Given the paucity of studies examining listing suspension from stock exchanges and corporate governance mechanisms, these findings contribute to the literature. Additionally, the dearth of research on corporate governance in developing countries suggests that our findings have important implications for policy makers in these countries as they endeavor to improve corporate governance.

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1. Introduction

This study investigates the relationship between corporate governance mechanisms and the suspension of listed firms by the JSE Securities Exchange (JSE) of South Africa (SA). The financial scandals and failures in the 1980s reignited debate on the most appropriate mechanisms for making corporate boards more effective (Demirag, Sudarsanam, & Wright, 2000). Against this backdrop, and from the early 1990s, an increasing number of developed, developing and emerging market countries have published corporate governance guidelines and codes of best practice (Demirag et al., 2000; Gregory, 2004; Mallin, 2004). However, in spite of this development, the majority of empirical research on the efficacy of corporate governance remains biased in favor of developed Anglo-Saxon countries (Shleifer & Vishny, 1997; Vafeas & Theodorou, 1998). Although there is a growing literature on developing Asian countries (e.g., Baek, Kang, & Park, 2004; Haniffa & Hudaib, 2006), direct empirical research on the effectiveness of corporate governance in Africa is almost non-existent (Okeahalam, 2004).

We contend (as do Demirag et al., 2000; Vafeas & Theodorou, 1998) that due to country differences,¹ it is desirable and warranted that “various governance structures should be separately examined in each country” (Vafeas & Theodorou, 1998:384). This would enable the evidence on the efficacy of governance mechanisms to be generalized across countries, which would in turn buttress the theories that are proffered and refute any suggestion that the existing evidence is a consequence of the idiosyncrasies in the institutional, cultural, and regulatory environments in developed Anglo-Saxon countries. In this context, we contribute to the literature in two main ways. First, in a departure from extant literature, we examine the efficacy of corporate governance mechanisms in SA, a developing country whose corporate governance system is drawn from the Anglo-Saxon model. Thus, we address the question of whether corporate governance structures established in developed countries are appropriate to cope with the challenges presented in developing countries, particularly in Africa. Our choice of SA is motivated by a number of factors. One, among developing and emerging economies, SA pioneered the publication of corporate governance guidelines and codes of best practice in 1994 (Demirag et al., 2000; Mallin, 2004). Two, SA is Africa’s largest economy with considerable influence on the continent.² Finally, there have been a number of corporate failures and financial irregularities in SA, notably, Fidentia, JCI-Randgold, Masterbond, Leisurenet, MacMed, and Regal Treasury Bank, some of which were blamed on weaknesses in corporate governance structures (Sarra, 2004; World Bank, 2003).

Second, we examine the relationship between corporate governance and incidences of listing suspension from the stock exchange, a setting in which the evidence is almost non-existent internationally. According to the World Bank (2003), the JSE appears to have a high incidence of firm suspension, thus providing us with an opportunity to examine the corporate governance

For example, stage of economic and capital-markets development, legal, socio-political, and economic environments. In Africa’s context, Okeahalam (2004) also notes some factors that suggest that corporate governance structures established in the developed world may be ineffective. These include business environment, protection laws, ownership structures, culture of corruption, lack of transparency, political interference, and the weak nature of institutions.

² In 1996, the JSE was ranked in terms of market capitalization as the 16th largest stock market in the world and the third largest emerging market (Jeffers & Okeahalam, 1999). Its influence is evident in Sub-Saharan Africa, where, for example, the Zimbabwe Stock Exchange Listing Requirements (2002) require listed firms to adopt corporate governance best practices as enshrined either in the SA code or the U.K. code.

effects.³ Prior studies focus on examining the association between corporate governance mechanisms and firm performance (Haniffa & Hudaib, 2006; Ho & Williams, 2003; Vafeas & Theodorou, 1998), earnings management (Klein, 2002), management forecasts (Ajinkya, Bhojraj, & Sengupta, 2005; Karamanou & Vafeas, 2005) and the quality of disclosure (Mangena & Pike, 2005). However, these studies are criticized for equating the effectiveness of board mechanisms with a firm's performance or reporting quality (Frankforter, Berman, & Jones, 2000; Kosnik, 1987). For example, Kosnik (1987: 163) argues that as long as management decisions and actions "are consistent with shareholders' interest and promote the long-term performance of the firm, any type of board (even a passive one) will appear effective."

We argue that better insights into the antecedents of effective corporate governance mechanisms might be gained by studying situations where firms are experiencing financial problems (Frankforter et al., 2000; Kosnik, 1987). In this context, there is a growing literature that examines the relationship between corporate governance and bankruptcy (Daily & Dalton, 1994), takeovers (Kosnik, 1987; Shivdasani, 1993; Frankforter et al., 2000), and the publication of defective financial statements or commission of illegal acts (Beasley, 1996; Peasnell et al., 2001). However, none of these studies have considered listing suspension. Listing suspension is important because it imposes significant costs on shareholders via a decrease in the share price (Macey, O'Hara, & Pompilo, 2005) and, therefore, provides a good setting in which to investigate whether corporate governance structures make a difference.

In our analysis we employ a matched-pairs research design of 81 firms suspended from the JSE in the period 1999–2005 and 81 control firms and perform conditional logistic-regression analyses. Our results show that corporate governance structures in suspended firms were relatively weak compared to control firms. We find a significant negative association between listing suspension and the proportion of non-executive directors and audit committee presence. We also find that incidences of suspension were relatively high in firms with block-share ownership. Further analysis splitting block-share ownership into institutional and non-institutional investors provides mixed results. While we find a positive association between suspension and non-institutional investors, we observe no association with institutional investors. We detect no relationship between suspension and board size, directors' share ownership and CEO Chair role duality. These findings have implications for policy makers in developing countries in their attempt to improve corporate governance.⁴

The remainder of the paper is organized as follows. Section 2 deals with the institutional framework for corporate governance in SA, while Section 3 reviews previous literature and develops the hypotheses. Section 4 describes the methodology used. The results are presented and discussed in Section 5, with concluding remarks presented in Section 6.

2. The institutional framework for corporate governance in South Africa

In the developing world, SA was the first to develop a corporate governance code of best practice via the King Report of 1994 (Demirag et al., 2000; Mallin, 2004). The report, which

³ Suspensions are made for a number of reasons, including (1) noncompliance with listing requirements, (2) when the firm is under provisional liquidation or judicial management, (3) at request of the company, (4) takeovers, or (5) when the JSE considers it to be in the public's best interest (JSE Listing Requirements, 2005).

⁴ In a contemporaneous study that was completed independently of our own, Charitou, Louka, and Vafeas (2007) also find a link between corporate-governance characteristics and the likelihood of exchange delisting using U.S. data.

was published by the King Committee on Corporate Governance, draws extensively from the U.K. Cadbury Committee of 1992. The code was revised in 2002 necessitated by post-1994 developments both locally (e.g., legislation such as the Employment Equity Act – No. 55 of 1998) and internationally (e.g., U.K. Combined Code of 1998). A conspicuous feature of the King Report (2002) is its adoption of the “inclusive approach” to corporate governance. While codes in other countries focus on shareholder-wealth maximization, the King Report encourages firms to consider a wider community of stakeholders.

With regard to the board of directors, the King Report highlights the board as the focal point of the corporate governance system. It recommends (a) a unitary board structure with a balance between executive and non-executive directors (NEDs), preferably with a majority of NEDs, of whom a sufficient number should be independent; (b) a separation of the roles of the chairperson (who should be an independent NED) and the chief executive officer (CEO); (c) that a substantial portion of the total remuneration of executive directors should be performance-based; and (d) formation of at least audit and remuneration committees, dominated and chaired by independent NEDs. Compliance with the King Report is generally voluntary. However, the JSE Listing Requirements (2005) oblige listed firms to disclose in their annual reports the extent of compliance with the King Report and reasons for noncompliance.

3. Literature review and hypotheses development

Prior literature (Weir, Laing, & McKnight et al., 2002; Ho & Williams, 2003; Ajinkya et al., 2005) contends that corporate-governance structures are associated with different organizational outcomes. We draw from this literature to examine the relationship between corporate governance and incidences of listing suspension by the JSE. Specifically, we consider board characteristics (board size, board composition, CEO/Chair role duality, audit committee presence) and ownership structures (directors' share of ownership, block-share ownership).

3.1. Board characteristics

Fama and Jensen (1983) suggest that the board is the central control mechanism responsible for minimizing agency costs that arise from the separation of ownership and decision control in corporations. We, therefore, argue that a well-constituted board of directors is more likely to act in the best interests of shareholders, and, therefore, would constrain managers to engage in activities that result in listing suspension.

Prior literature argues that board size is an important aspect of effective corporate governance (Jensen, 1993; Yermack, 1996) and is related to firm performance (Baek et al., 2004; Haniffa & Hudaib, 2006). A larger board is more likely to have a greater range of expertise to monitor the actions of management effectively (Beasley, 1996; Karamanou & Vafeas, 2005) and also in securing critical resources (Goodstein et al., 1994). In contrast, Jensen (1993) and Yermack (1996) argue that large boards may be less cohesive and slow in making decisions, less candid in discussions of managerial performance, more difficult to coordinate, and easier to control by the CEO, thus constraining the board's effectiveness.

In general, the literature (e.g., Jensen, 1993; Karamanou & Vafeas, 2005) suggests that boards must be small enough for true discussion and debate between members to take place and large enough to have members with a mix of business judgment and experience. Both Lusch, Netter, and Yang (2008) and Boone, Field, Karpoff, and Raheja (2007) provide evidence suggesting that firms structure their boards in a manner that reflects the costs and benefits of monitoring the firm. In South Africa, the JSE Listing Requirements (2005) specifies that the minimum number of directors for listed firms should be four, while the King Report (2002) only recommends that the board should be of a size that allows for a diversity of expertise and experience to be effective monitors. A Deutsch Bank (2002) survey of 73 major South African firms revealed that board size ranges from five to 30 directors, with a mean directorship of 12.

Empirically, the evidence on the association of board size with different organizational outcomes is mixed. Yermack (1996) finds an inverse relationship between board size and firm performance, whilst Haniffa and Hudaib (2006) report a positive relationship with operating performance. Karamanou and Vafeas (2005) also find a positive relationship between board size and management earnings forecasts. In a study that included SA, Ho and Williams (2003) fail to detect a significant relationship between performance and board size. We hypothesize the following:

H1. There is a significant relationship between board size and incidences of listing suspension from the JSE.

The King Report (2002) recommends that the board should have a balance of executive and non-executive directors (NEDs), preferably with the majority being NEDs.⁵ A number of studies (e.g., Ho & Williams, 2003; Weir et al., 2002) argue that the effectiveness of the board is enhanced by the inclusion of NEDs. NEDs are perceived to be more independent of management (Amukya et al., 2005; Peasnell et al., 2001) and are unlikely to collude with managers to engage in actions that compromise shareholders' interests (Fama & Jensen, 1983; Mangena & Pike, 2005). Additionally, NEDs have incentives to maintain their reputation capital since the market for directorships prices them according to their performance (Shivdasani, 1993). Well-performing NEDs are likely to be rewarded with additional board opportunities and benefits, while poorly performing NEDs are likely to be penalized by the loss in positions and benefits. Therefore, the suspension of listing could have consequences for NEDs as it may be perceived by the market as a failure by the NEDs to monitor management effectively.

The empirical literature generally supports the notion that a higher proportion of NEDs improves the ability of the board to monitor managerial performance. For example, studies show that boards with a greater proportion of NEDs are (a) more likely to resist payment of greenmail (Kasnik, 1987), perform better (Weir et al., 2002) or enhance management-accountability (Amukya et al., 2005; Karamanou & Vafeas, 2005) and (b) reduce the

⁵ The JSE Listing Requirements (2005) and the King Report (2002) does not stipulate the minimum number or percentage of non-executive directors.

likelihood of financial fraud (Beasley, 1996; Peasnell et al., 2001) or earnings management (Klein, 2002). We therefore hypothesize the following:

H2. There is a significant negative relationship between the proportion of non-executive directors and incidences of listing suspension from the JSE.

The King Report (2002: 24) regards role duality as undesirable and recommends that there should be a separate role for the CEO and chairman in listed firms "to ensure a balance of power and authority so that no one individual has unfettered powers of decision-making." From an agency perspective, combining the positions of CEO and chairman constrains the board's oversight role. Fama and Jensen (1983) argue that role duality portrays the absence of separation between decision control and decision management. They suggest that combining these two important roles creates a strong individual power base which could limit the board's ability to execute its duties. In contrast, Haniffa and Hudaib (2006) argue that there are advantages in combining the two roles. For example, the individual is more likely to develop a greater understanding and knowledge of operations, which enables him/her to direct the firm strategically with minimum board interference.

Empirically, the findings are mixed. Beasley (1996) finds no evidence that role duality affects financial fraud. Similarly, Vafeas and Theodorou (1998), Weir et al. (2002) and Haniffa and Hudaib (2006) report no significant relationship with performance. In contrast, Peasnell et al. (2001) find a negative relationship with adverse rulings by the Financial Reporting Review Panel (FRRP). In a study that included SA, Ho and Williams (2003) find a negative relationship between role duality and firm performance. The results by Ho and Williams (2003) are consistent with anecdotal evidence that indicates that role duality in SA is problematic (see Sarra, 2004). We therefore hypothesize the following:

H3. There is significant positive relationship between role duality and incidences of listing suspension from the JSE.

It is suggested (Cadbury Committee, 1992; King Report, 2002) that the extent of board monitoring is strengthened by the presence of an audit committee (AC). The AC is assumed to monitor management, and both the internal and external auditors, in order to protect the interests of shareholders (Cadbury Committee, 1992). The King Report (2002) recommends that listed firms must have an AC whose primary role is to ensure the quality and credibility of the financial-reporting process, as well as reducing fraudulent activities.

Empirical studies show a negative association between the presence of an AC and financial fraud (Dechow, Sloan, & Sweeney, 1996), earnings management (Klein, 2002), and incidences of adverse rulings by the FRRP (Peasnell et al., 2001). Karamanou and Vafeas (2005) find that firms with ACs are more likely to make management forecasts. Similarly, we argue that incidences of listing suspension should be lower in firms with an AC. To this end the AC helps in ensuring compliance with listing reporting requirements of the stock exchange, as well as preventing fraudulent activities that may lead to bankruptcy or liquidations (Klein, 2002; Peasnell et al., 2001). Thus, we hypothesize the following:

H4. There is a significant negative relationship between audit committee presence and incidences of listing suspension from the JSE.

3.2. Ownership structure variables

Morck, Shliefier, and Vishny (1988) and McConnell and Servaes (1990) provide some evidence that ownership structure is important in reducing agency costs. Agency theory (Fama, 1980) suggests that share ownership by directors helps to alleviate the conflicts of interest that exist between the directors and shareholders. Jensen (1993) argues that directors who hold a large equity stake in the firm are more likely to have a greater incentive to monitor managers in order to protect their investments. Empirical studies generally support this notion. For example, evidence shows a positive relationship between directors' share ownership and firm performance (Short & Keasey, 1999) and management forecasts (e.g., Karamanou & Vafeas, 2005). We therefore hypothesize the following:

H5. There is a significant negative relationship between directors' share ownership and incidences of listing suspension from the JSE.

The Cadbury Committee (1992) emphasizes the role of shareholders in enhancing corporate governance. Karamanou and Vafeas (2005) suggest that block shareholders are best suited for monitoring management due to their access to better information about the firm. Weir et al. (2002) also argue that there is greater potential for agency costs related to poor performance for blockholders, thus providing greater incentives to monitor. Similarly, Shivdasani (1993) argues that blockholders have stronger incentives to invest in voting on corporate issues than non-blockholders.

On the contrary, Ajinkya et al. (2005) argue that there are circumstances under which blockholders behave as insiders. They suggest that blockholders may have undue influence over management and, therefore, secure self-serving benefits that are detrimental to other shareholders. This view is pertinent in the context of SA, because share ownership on the JSE is relatively concentrated (Malherbe & Segal, 2001; Sarra, 2004; World Bank, 2003). The controlling shareholders exert influence on management decisions through, in certain cases, electing their own representatives to the board of directors (Malherbe & Segal, 2001; World Bank, 2003). This problem, commonly referred to in SA as shadow directorship (King Report, 2002; World Bank, 2003), causes inefficiencies in the monitoring process as the controlling shareholders, though not directors per se, are able to exert influence on board activities. Thus, rather than being involved in monitoring and assessing the governance of the firms, shadow directors become involved indirectly in the running of the firms (World Bank, 2003). This may lead them to have incentives to extract private benefits that are not available to minority shareholders (Shivdasani, 1993).

The empirical evidence is mixed. Haniffa and Hudaib (2006) find a positive relationship with firm performance, while Baek et al. (2004) report a negative relationship. Shivdasani (1993) shows that blockholders who are affiliated with management increase, while unaffiliated blockholders decrease hostile takeovers. Yet Weir et al. (2002) detect no significant relationship. Hence, we hypothesize the following:

H6. There is a significant relationship between block-share ownership and incidences of listing suspension from the JSE.

4. Methodology

4.1. Sample selection and data

To conduct our analysis, we employ a matched-pairs research design (Hosmer & Lemeshow, 2000; Peasnell et al., 2001). The main advantage of this approach is that “it provides a parsimonious means of controlling for certain potentially important confounding (non-accounting) firm-specific characteristics” of targeted firms (Peasnell et al., 2001:297). The data used in the analysis is drawn from annual reports obtained via the McGregor Data System, firm secretaries, and the University of Cape Town library. The sample was selected as follows. We submitted a request to the JSE for information about suspended firms and received a list containing 538 firms suspended in the period 1999–2005. From this list, annual reports were obtained for 114 suspended firms. Drawing from prior literature (e.g., Beasley, 1996; Peasnell et al., 2001), each of these firms was matched with a similar unsuspended (control) firm in terms of industry, size (total assets), and time period. We eliminated ten firms due to missing data and 23 because no suitable matching firms were identified. The matching procedure resulted in a final sample of 81 paired firms.⁶ Table 1 presents the distribution of the suspended firms.

4.2. Regression model specifications

We use conditional logistic-regression analysis (Hosmer & Lemeshow, 2000) for two main reasons. First, our dependent variable is dichotomous and, therefore, the ordinary least squares (OLS) regression analysis is inappropriate for estimating the parameters (Tabachnick & Fidell, 1996; Hosmer & Lemeshow, 2000). Second, according to Hosmer and Lemeshow (2000), a conditional logistic regression is more appropriate because it preserves the matched character of the sample. Thus, the following model is estimated:

$$\text{SUSPEND} = \beta_1 \text{BOARDSIZE} + \beta_2 \text{PROPNET} + \beta_3 \text{DUALITY} + \beta_4 \text{DSHARE} + \beta_5 \text{BLOCK} + \beta_6 \text{ACPRES} + \beta_7 \text{CONTROL} + e_i \quad (1)$$

Where:

SUSPEND Listing suspension, measured as a dummy variable coded one if firm was suspended, zero if it's a control firm.

BOARDSIZE Total number of board members.

⁶ Each firm was matched using the three-digit Standard Industrial Classification Code (SIC) (which is the narrowest industry classification by the JSE). Following Kaplan and Reishus (1990), a cut-off of + 50% was used. Each firm was first matched at the same sub-sector level and if no suitable firm was identified at the sub-sector level, the same process was repeated at the sector and super-sector levels, respectively. Thirty-nine firms were matched at the sub-sector level, 34 at the sector level, and eight at the super-sector level. Using a paired t-test, we find no significant differences in terms of total assets between our suspended and control firms, suggesting that our matching was successful.

Table 1
Analysis of sample of suspended firms by the JSE: 1999–2005

Type of analysis	No	%
<i>Panel A: analysis by year of suspension</i>		
2005	13	16.1
2004	12	14.8
2003	12	14.8
2002	18	22.2
2001	11	13.6
2000	11	13.6
1999	4	4.9
Total	81	100
<i>Panel B: analysis by industrial sector</i>		
General retailers	11	13.6
Mining	11	13.6
Software and computer services	12	14.8
General financial firms	10	12.4
Electronic and electrical equipment	6	7.4
Equity investment instruments	6	7.4
Real estate	6	7.4
Travel and leisure	4	4.9
Industrials	7	8.6
Others	8	9.9
Total	81	100
<i>Panel C: analysis by reason for suspension</i>		
Liquidation / winding-up / judicial management	35	43.2
Non-compliance with listing requirements ^a	15	21.0
At the request of the directors	13	16.1
Scheme of arrangements / takeover offers ^b	12	12.3
Others	6	7.4
Total	81	100

^a Of the 15 firms, 11 failed to submit annual financial statements and four failed to comply with other listing requirements.

^b Takeover offers are in terms of Section 440K of the Companies Act of 1973 as amended.

PROPNET: Board composition, measured as the number of non-executive directors scaled by total board members.

DUALITY: Role duality, measured as a dummy variable with a value of one if the position of chair and CEO are held by separate persons, zero if otherwise.

ACPRESEN: Audit committee presence, measured as a dummy variable with a value of one if the board has an audit committee, zero if otherwise.

DSHARE: Directors' share ownership, measured as the number of shares held by all directors of the board scaled by total number of shares.

BLOCK: Block-share ownership, measured as the number of shares held by shareholders with at least 5% holding scaled by total number of shares.

CONTROL: Control variables: Type of auditor (AUDITOR), measured as a dummy variable with a value of one if the firm is audited by one of the Big-4 audit firms, zero otherwise. Gearing ratio (GEAR), measured as total debt scaled by total assets.

and Return of assets ROA), measured as profit before tax scaled by total assets. These control variables are drawn from prior literature (e.g., Peasnell et al., 2001).

5. Empirical results

5.1. Descriptive statistics and univariate analysis

The summary descriptive statistics for both suspended and control firms and the related univariate tests are presented in Table 2. Panel A presents the statistics for continuous variables, while Panel B provides the statistics for categorical variables.

Panel A reveals that suspended firms tend to have a smaller board of directors (BOARDSIZE) than control firms. The mean (median) number of directors is 7.099 (6.000) compared with 7.654 (7.000) for control firms. For board composition, we observe a lower proportion of non-executive directors (PROPND) for suspended firms, with a mean (median) of 41.3% (45%) compared to 57.3% (60%) for the control firms. The mean (median) director's share ownership (DSHARE) is about 20.4% (12%) for the suspended firms and about 23.2% (18%) for the control firms, while the mean (median) block-share ownership (BLOCK) is 61.1% (66%) for the suspended firms and about 50.1% (47.5%) for the control firms. As for the control variables, the suspended firms tend to be highly geared (GEARING) and less profitable (ROA), with a mean (median) of 86.2% (89%) and -4.3% (4%) compared to about 46.6% (45%) and 3.8% (5.1%) for the control firms, respectively. The Mann-Whitney U tests in Table 2, Panel A indicate that there are

Table 2
Descriptive statistics of the sample

Panel A: continuous variables^a

Variables ^a	Suspended firms					Control firms					Tests
	Mean	Median	25th	75th	Std dev	Mean	Median	25th	75th	Std Dev	Z-value
BOARDSIZE	7.099	6.000	5.000	9.000	2.905	7.654	7.000	6.000	9.000	2.647	-1.272
PROPND	.413	.450	.280	.565	.218	.573	.600	.475	.710	.209	-4.784***
DSHARE	.204	.120	.020	.361	.220	.232	.180	.030	.355	.242	-.763
BLOCK	.611	.660	.420	.828	.267	.501	.475	.368	.695	.258	2.075**
GEARING	.862	.890	.530	1.130	.505	.466	.450	.260	.650	.279	6.166***
ROA	-.043	.040	-.140	.110	.347	.038	.051	-.015	.157	.351	-1.459

Panel B: categorical variables^a

Variables ^a		Suspended firms	Control firms	Chi-square value
DUALITY	Coded 1	64.2%	59.3%	.418
	Coded 0	35.8%	40.7%	
ACPRES	Coded 1	70.4%	85.2%	5.143**
	Coded 0	29.6%	14.8%	
AUDITOR	Coded 1	67.9%	60.5%	.967
	Coded 0	32.1%	39.5%	

***, Significant at the 0.01 level (2-tailed); **, Significant at the 0.05 level (2-tailed).

^a Mann-Whitney U tests for the continuous variables; and chi-square test for categorical variables.

systematic differences between the suspended and control firms only with respect to PROPNED, BLOCK, and GEARING.

The results in panel B indicate that suspended firms are more likely than control firms to have a combined role of chief executive officer and chairman (DUALITY). We also observe that control firms are more likely to have an audit committee presence (ACPRES) than suspended firms. Surprisingly, the results suggest that suspended firms are more likely to be audited by a larger auditing firm than the control firms (AUDITOR). However, we observe from the chi-square tests that there is a significant difference between suspended and control firms in respect of ACPRES only.

5.2. Results of logistic-regression analysis

5.2.1. Correlation matrix and multicollinearity

A major concern in regression analysis is the problem of multicollinearity among the independent variables. In Table 3, we provide the Spearman's rho correlations between the independent variables to examine whether multicollinearity is problematic. The results reveal several significant relationships ($p < .05$) among the independent variables. Although the correlations are significant, all except BOARDSIZE and ACPRES ($r = 0.669$) are below 0.40. As a rule-of-thumb, multicollinearity in regression analysis is considered harmful only when correlations exceed 0.7 (Tabachnick and Fidell, 1996). Additionally, we also compute and examine the variance inflation factors (VIFs) for each independent variable. In all cases, except for BOARDSIZE and ACPRES, the VIFs are below two. The VIFs for BOARDSIZE and DUALITY are 3.833 and 3.567 respectively, which are far below the critical value of 10 (Tabachnick and Fidell, 1996), suggesting multicollinearity is not a major problem.

5.2.2. Regression-analyses results

Table 4 presents the results of the conditional logistic-regression analyses of the relationship between incidences of suspension from the JSE and corporate governance mechanisms. In Model 1, our measure for BLOCK is the aggregate shareholding of all blockholders. However, given that institutional investors in South Africa are inactive

Table 3
Spearman's rho correlations among independent variables

Variable ^a	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. BOARDSIZE	1.000								
2. PROPNED	.277***	1.000							
3. DUALITY	.008	.135	1.000						
4. ACPRES	.669***	.366***	.129	1.000					
5. DSHARE	.095	-.081	.100	-.033	1.000				
6. BLOCK	-.065	.071	.086	.017	-.108	1.000			
7. AUDITOR	.262***	.002	-.058	.034	-.262***	.120	1.000		
8. GEARING	-.069	-.103	-.009	.026	.030	.012	.036	1.000	
9. ROA	.210***	.091	.095	.283***	-.056	-.036	.006	-.129	1.000

***. Significant at the 0.01 level (2 tailed).

Table 4
Conditional logistic-regression results of the association of corporate governance mechanisms with incidences of listing suspension from the JSE Securities Exchange

Variables ^a	Predicted sign	Model 1		Model 2	
		Coefficient	Wald χ^2	Coefficient	Wald χ^2
<i>Corporate-governance variables</i>					
BOARDSIZE	+/-	.049	.093	-.130	.474
PROPNET	-	8.185	10.562***	6.854	8.328***
DUALITY	+	.233	1.34	.445	.441
ACPRES	-	2.312	4.197**	-1.992	4.159**
DSHARE	-	.524	1.58	1.159	.576
BLOCK	+/-	2.944	3.235**		
BLOCK 1	-			-2.803	1.781
BLOCK 2	+/-			2.398	4.848**
<i>Control variables</i>					
AUDITOR		.334	.303	1.174	2.245
GEARING	+	4.302	12.344***	3.165	7.445***
ROA	-	-.035	.002	.317	.121
Number of pairs			81		81
Constant (-2LL)			112.290		112.290
Model χ^2			70.249***		72.717***
Pseudo R^2			.626		.647

***, Significant at the 0.001 level (2-tailed); **, Significant at the 0.05 level (2-tailed).

(World Bank, 2003), they possibly have little influence over management decisions. Consequently, in Model 2, we re-estimate the regression analysis using a definition that splits block-share ownership into institutional investors (BLOCK 1) and non-institutional investors (BLOCK 2).^b Our rationale for this is to provide some insights into the class of blockholders who are likely to be associated with incidences of listing suspension, and possibly associated with the problem of shadow directorship. As Holderness and Sheehan (1988) suggest, the two classes of blockholders may have different motivations for influencing management decisions.

The results in Table 4 indicate that the conditional logistic-regression models are significant in explaining incidences of suspension by the JSE at the 0.05 level or better as signified by the Model χ^2 statistic. The model's Pseudo R^2 is 62.6% for Model 1 and 64.7% for Model 2, and the results are similar in both models. The coefficient of BOARDSIZE is not significant, and thus inconsistent with our expectation in H1. However, the results are

^a As noted by the World Bank (2003), a striking feature of this inactivity is that few institutional investors actually attend annual general meetings. Malherbe and Segal (2001) attribute this to the reluctance by SA institutional investors to assume a powerful role in the corporate sector. They suggest that the reluctance derives from the concern that it might draw government attention and possible obligations, particularly given the popular policy whereby the government often prescribes investments for institutional investors.

^b We define institutional investors as insurance firms, banks, pension funds, and mutual funds, and non-institutional investors as firms and individuals (Holderness and Sheehan, 1988). For our non-institutional investors, we were unable to use the finer blockholder variables that distinguish between affiliated (management friendly) and unaffiliated (independent) blockholders (see Shivdasani, 1993), due to data limitations.

consistent with prior literature (e.g., Peasnell et al., 2001) that also reports no significant relationship between board size and incidences of adverse rulings by the FRRP. In a study that included South Africa, Ho and Williams (2003) also fail to detect a significant relationship with performance. These results suggest that the size of the board does not influence the quality of monitoring.

Our results indicate, in both models, that PROPNET is significantly and negatively associated with incidences of suspension, thus accepting H2. This is consistent with Kosnik (1987), who also reports a negative relationship between payment of greenmail and the proportion of NEDs. The negative coefficients demonstrate that firms with a higher percentage of NEDs are less likely to be suspended from the exchange. This suggests that NEDs are more effective in monitoring management activities (Beasley, 1996; Karamanou & Vafeas, 2005),⁹ thereby ensuring conformance with interests of shareholders and the requirements of the stock exchange.

The hypothesis of the relationship between listing suspension and DUALITY (H3) was not supported. However, the estimated coefficient is positive and thus consistent with our prediction. The positive coefficient is contrary to prior similar studies (e.g., Beasley, 1996; Peasnell et al., 2001; Ho & Williams, 2003), but consistent with anecdotal evidence in SA (see Sarra, 2004). As for ACPRES, the coefficient is negative and statistically significant as predicted. This result is consistent with Peasnell et al. (2001), but contradicts Beasley (1996), who finds no significant association between audit committee presence and financial fraud. Our results suggest that ACs may engage in actions that prevent suspension from the stock exchange.

The relationship between DSHARE and incidences of listing suspension is not significant, and thus our hypothesis (H4) is not supported.¹⁰ Our results suggest that share ownership by directors does not influence the likelihood of suspension. These results are consistent with Peasnell et al. (2001), but contradict Karamanou and Vafeas (2005).

In Model 1, the results indicate that the relationship between BLOCK and suspension is significant, thus supporting H5. The coefficients are positive, suggesting that the likelihood of suspension increases with BLOCK, which is consistent with the findings of Baek et al. (2004). Shivdasani (1993) also shows that blockholders affiliated with management increase, while unaffiliated blockholders decrease, hostile takeovers. The results contradict McConnell and Servaes (1990), who fail to support a relationship between firm performance and BLOCK. Both Beasley (1996) and Peasnell et al. (2001) also report no relationship with fraudulent financial reporting. Additionally, the results are not consistent with Daily and Dalton (1994), who report a negative relationship with bankruptcy. The results suggest that blockholders are not effective monitors of management. These results are important, particularly in the context of SA, where the problem of shadow directorship is said to be more prevalent (Malherbe & Segal, 2001; World Bank, 2003). Our results seem to support the view by the King Report (2002) that no individual blockholder should dominate the board.

⁹ We were unable to make a distinction between grey non-executive directors and independent non-executive directors owing to limited information. Although the King Report (2002) recommends a majority of independent non-executive directors, this information is not available in the annual reports.

¹⁰ Other previous studies examine managerial share ownership rather than board of directors' share of ownership (e.g., Peasnell et al., 2001). While the total percentage holding of the directors is provided in the annual reports, the relation on individual directors' holding was difficult to determine from the annual reports of most firms in our sample.

Results of further analysis of the relationship between block-share ownership and listing suspension (as shown in Model 2) are mixed. BLOCK 1 is not statistically significant, although the coefficient is negative. This finding supports the argument that institutional investors in South Africa are inactive monitors of management activities (Malherbe & Segal, 2001; World Bank, 2003). For BLOCK 2, the coefficient is positive and significant at the 5% level, suggesting that the probability of suspension from the JSE is higher where share ownership by block non-institutional investors is higher. This is consistent with non-institutional blockholders having monitoring incentives that are geared towards their own interests. It is possible that these blockholders are the “shadow directors” who exert influence on management decisions.

For the control variables, the coefficients of GEARING are positive and significant, suggesting that highly geared firms are more likely to be suspended. These results support the findings of Peasnell et al. (2001). With regard to ROA, the coefficients are negative, but not significant consistent with Peasnell et al. (2001). Finally, AUDITOR is not significant, thus contradicting Peasnell et al. (2001).

5.2.3. *Additional analyses*

We perform additional analyses to check the robustness of our results. First, although the analyses in Section 5.2.1 suggest that the correlations among the independent variables are within suggested bounds (see Tabachnick & Fidell, 1996), we feel that the correlation between BOARDSIZE and ACPRES ($r=0.669$) may be too high. Consequently, we re-estimate our regressions by including these two variables in separate models. Our results as reported in Table 4 are largely unaffected.

Second, the literature on board size (e.g., Yermack, 1996; Karamanou & Vafeas, 2005) and directors' share ownership (e.g., Morck et al., 1988; McConnell & Servaes, 1990; Short & Keasey, 1999) suggests a non linear relationship between performance and board size as well as directors' share ownership. Consistent with Mangena and Pike (2005), we include as an additional variable, board size squared (BOARDSIZE^2) and rerun the regression models. The results remain unchanged.

Finally, based on Morck et al. (1988), we introduce a number of zero-one dummy variables for different levels of directors' share ownership and rerun the regression model (less than 5%, 5% to less than 25%, and more than 25%). Again, we find that our results as reported in Table 4 remain largely similar. Overall, these analyses suggest that our results are robust.

6. Summary and concluding remarks

In this study, we examine the relationship between corporate governance mechanisms and incidences of listing suspension by the JSE. We find a negative relationship between proportion of non-executive directors and listing suspension. This is consistent with the notion that non-executive directors are better monitors of management (Ajinkya et al., 2005). It also implies that the King Report's (2002) recommendation that boards should comprise a majority of non-executive directors is a step in the right direction. This is particularly important in light of recent corporate failures in South Africa that have been blamed on poor corporate governance structures (see Sarra, 2004).

Another important finding of our study relates to block-share ownership. We find that firms with block-share ownership are more likely to be suspended from the stock exchange. Additional analysis splitting block-share ownership into institutional investors and non-institutional investors, continues to support our finding. While we find no relationship between suspension and institutional investors, the results for non-institutional investors are significant and positive. These results have important policy implications for corporate governance particularly given the “shadow directors” problems in the SA corporate sector. The recommendations of the King Report (2002) that shadow directors should be discouraged may be well founded. Furthermore, our findings buttress the call for an active role in corporate governance by institutional investors who are said to be inactive (Malherbe & Segal, 2001; World Bank, 2003). Given their high share ownership on the JSE, they are well placed to constrain the self-servicing activities of block non-institutional investors.

Our results also suggest that the presence of an audit committee is negatively associated with suspension. This is consistent with the notion that audit committees enhance the quality of monitoring. Finally, we find no relationship between suspension and the remaining corporate governance mechanisms (i.e., board size, role duality, directors’ share ownership).

This study contributes to the literature on corporate governance mechanisms and to the corporate governance debate in SA, and indeed Africa as a whole and the rest of the world. We find that corporate governance mechanisms are related to the suspension of listing from the JSE. These findings are important due to the attention directed on corporate governance around the world. In the context of Africa, these results show that the corporate governance structures implemented in the developed world are important to the corporate sector in Africa and should be considered seriously. Effective corporate governance structures could improve the participation of foreign investors on stock exchanges of developing countries. Our study also contributes to the literature by providing evidence in an African country, where empirical research on corporate governance at the firm-level is almost non-existent.

While our results are important, they must be interpreted in the light of the following limitations. First, our sample of 81 suspended firms could be considered small, although this is not unusual in accounting studies of this nature (see for example, Peasnell et al., 2001). Second, we only examine a small set of corporate governance variables constrained by the sample size. Third, we do not make a distinction between internal and external block-share ownership due to data limitations. Further research could address some of these limitations by investigating different settings. For example, research could use a large sample size and examine the link between corporate governance and measures such as earnings management, disclosure, and performance. Such research could also distinguish between independent and non-independent non-executive directors, internal and external block-share ownership and also examine audit committee characteristics. Additionally, research could extend this study to other countries given the paucity of studies examining listing suspension internationally. Finally, other research could evaluate compliance with the King Report’s “inclusive approach” to corporate governance and the effect of compliance on firm performance.

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Using accounting ratios to distinguish between Islamic and conventional banks in the GCC region

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Abstract

This study determines whether it is possible to distinguish between conventional and Islamic banks in the Gulf Cooperation Council (GCC) region on the basis of financial characteristics alone. Islamic banks operate under different principles, such as risk sharing and the prohibition of interest, yet both types of banks face similar competitive conditions. The combination of effects makes it unclear whether financial ratios will differ significantly between the two categories of banks. We input 26 financial ratios into logit, neural network, and *k*-means nearest neighbor classification models to determine whether researchers or regulators could use these ratios to distinguish between the two types of banks. Although the means of several ratios are similar between the two categories of banks, non-linear classification techniques (*k*-means nearest neighbors and neural networks) are able to correctly distinguish Islamic from conventional banks in out-of-sample tests at about a 92% success rate.

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1. Introduction

Since the establishment of the Dubai Islamic Bank in 1975 as the world's first private interest-free bank, the growth of Islamic banking world-wide has been phenomenal with

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assets under management generally growing at annual rates of 12% to 15% per year. In Iran, Pakistan, and Sudan the entire banking industry has become Islamic and many large international banks (e.g., HSBC, BNP Paribas, Commerzbank, and Citicorp) have introduced Islamic divisions that offer separate Islamic or Sharia-compliant products within an otherwise conventional banking structure. According to the Institute of Islamic Banking and Insurance (IIBI) there were 277 Islamic banks and financial institutions operating in over 70 countries in 2005.¹ IIBI estimated that Islamic banks managed assets worth about \$260 billion in 2004. Much of the initial growth in Islamic banking occurred in South Asia; however, beginning in the 1990s the primary growth area and focus of Islamic banking shifted to the countries of the Gulf Cooperation Council (GCC) region.² Molyneux and Iqbal (2005) estimate that Islamic banks in the GCC region held about 74% of Islamic banking system assets in 2002. Following the events of September 11, 2001, a considerable amount of Arab money flowed out of western countries back to the Middle East. This has further increased the dominance of the GCC region in Islamic banking world-wide.³

The principles guiding Islamic banks are significantly different from those for conventional banks. Islamic banks are organized under and operate upon principles of Islamic law (the Sharia) which requires risk sharing and prohibits the payment or receipt of interest (*riba*). In contrast, conventional banks are guided mainly by the profit-maximization principle. If the differences between the two types of banks are not just semantic (as some critics of Islamic finance have maintained), Islamic and conventional banks should be distinguishable from one another on the basis of financial information obtained from company balance sheets and income statements. However, since all banks operate in the same competitive environment and are regulated in the same way in most countries, it is possible that Islamic and conventional banks display similar financial characteristics.

A sizeable body of research examines the structure, operation, and management of banks in the GCC region [Turen (1995), Murjan and Ruza (2002), Islam (2003), Essayyad and Madani (2003)], while another strand of literature explains general Islamic financial principles to the non-Muslim reader [Siddiqui (1981), Bashier (1983), Khan (1985)]. With the exception of Karim and Ali (1989) and Rosly and Abu Bakar (2003), researchers have not examined the financial ratios of Islamic banks. Karim and Ali (1989) suggest that Islamic banks prefer to obtain funds from depositors rather than shareholders during expansionary periods in an economy. When combined with the requirement for risk sharing, return on equity should be higher for Islamic than for conventional banks. Rosly and Abu Bakar (2003) show that profitability (based upon return on assets, profit margin,

Data are obtained from the Institute of Islamic Banking and Insurance website <http://www.islamic-banking.com/banking/statusib.php>, last updated in 2005 (Institute of Islamic Banking and Insurance, 1995).

The GCC region consists of Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, and the United Arab Emirates.

¹ Hume's (2004) estimate of Islamic bank assets of \$260 billion was likely based on 2002 year-end data. At that time, GCC Islamic bank assets totaled \$226 billion, or 87% of all Islamic financial system assets. To further illustrate the relative size of the GCC Islamic banking industry, Rosly and Abu Bakar (2003) report that the assets of Islamic banks in Malaysia (one of the initial predominant countries in Islamic banking) totaled \$3.9 billion in 2000. In contrast, GCC bank assets in 2000 totaled US\$145 billion.

and net operating margin) was statistically higher for Malaysian Islamic banks during the period 1996–1999 than for mainstream banks. Operating-efficiency and asset-utilization ratios were smaller for Islamic banks, suggesting that there may be some financial and operational differences between banks. However, they point out that in recent years Islamic banks have chosen to behave more like mainstream banks instead of than strictly following Sharia principles. In summary, the research to date leaves unresolved the question of whether Islamic and conventional banks are operationally different outside of South Asia and whether financial ratios can be used to meaningfully distinguish between the two types of banks.

The purpose of this paper is to determine whether Islamic and conventional banks in the GCC region are distinguishable from one another on the basis of financial characteristics alone. Specifically, we consider whether researchers or regulators could correctly categorize a bank as Islamic or conventional using 26 financial ratios. Although many studies have documented the usefulness of accounting information in predicting bankruptcy and credit rating, no research has been conducted on the potential information value of accounting data in distinguishing between Islamic and conventional banks.

We collected 237 observations, or bank-years of data, for 141 conventional and 96 Islamic banks operating in the GCC during the period 2000–2005. The sample includes all GCC banks, but excludes international banks operating in the region. Our within-sample analysis shows that a logit model distinguishes between conventional and Islamic banks at a 77.2% accuracy rate. Out-of-sample classification rates range from 85.4% (for logit) to 91.7% accuracy for non-linear classification techniques (*k*-means nearest neighbors and neural networks).

This study proceeds as follows: Section 2 provides background on the differences between Islamic and conventional banks. The GCC banking sector is discussed in Section 3. Section 4 lists the hypotheses to be tested in this study. Section 5 describes the data and defines the accounting ratios used in the study. Section 6 presents in-sample results and interpretations, while Section 7 discusses results for the out-of-sample classification. Section 8 concludes with a discussion of implications, limitations, and suggestions for future research.

2. Islamic banking

In general, Islamic banks are governed and guided by Islamic laws (*Sharia*). Islamic banks have several distinguishing features. The first and most important feature of Islamic banks is the prohibition of interest (*riba*), regardless of its form or source. The holy book of Islam (the *Qur'an*) prohibits both the receipt and payment of interest in all transactions. The rationale is that the credit system involving interest leads to an inequitable distribution of income in society. *Riba* is not a payment for taking risks, nor is it the reward for a constructive activity. However, without some kind of reward, Islamic banks could not operate. Although Islamic banks cannot charge fixed interest in advance, they operate by participating in the profit resulting from the use of bank funds. The concept of interest is replaced by profit and loss sharing, but a mark-up for delayed payments and trade-financing commissions are allowed under the Islamic banking model. Although *riba* is a fundamental concept in Islamic banking, Islamic religious scholars do

not agree on an exact definition. Iqbal (2006, p. 3) notes that there are three distinct views of *riba*:

“(The) Liberal view confines *riba* to usury only and, thus, does not recommend any change in the modern financial system in which bank interest plays the pivotal role. According to mainstream view, *riba* also includes bank interest. Therefore, it implies a major restructuring of conventional financial system, though practically interest has been replaced mainly with mark-up, which is quite similar to interest on economic grounds. Mainstream jurists also emphasize deepening of capital markets for the success of emerging interest-free system. (The) Conservative view further extends the definition of *riba* to major forms of social injustice like contracting of subsistence wages and profiteering. This view suggests a radical change in whole economic system on the lines of Marxian philosophy.”

The differing interpretations of *riba* mean that some Islamic banks may offer products that other Islamic banks find unacceptable.⁴ However, an examination of annual reports indicates that Islamic banks in the GCC region operate similarly and offer a similar range of products. Unfortunately, these annual reports do not provide a detailed discussion regarding how *riba* is defined for each bank.

A second principle of Islamic banking is risk sharing, meaning that Islamic banks should operate only using profit loss sharing arrangements (PLS). The two most popular forms of PLS are Mudaraba and Musharaka (see the Appendix A for definitions of the various Islamic financial instruments). Islamic banks receive funds from the investing public on the basis of Mudaraba (profit sharing). The bank is allowed to use the funds in any activity that the management feels appropriate, so long as the activities are not forbidden by Islamic laws.⁵ Islamic banks find borrowers (entrepreneurs) who will use the funds for investments that are approved by the bank (Musharaka). The entrepreneurs share the profit/loss with the Islamic bank according to an agreed upon ratio. The bank then pools all profits and losses from different investments and shares the profit with depositors of funds according to a predetermined formula. Islamic banks are partners with both depositors and entrepreneurs and they share risk with both.

Conventional banks use both debt and equity to finance their investments, while Islamic banks are expected to depend primarily upon equity financing and customers' deposit accounts, i.e., current, saving, and investment [Karim and Ali (1989)].⁶ The current account is basically a safekeeping account. It is very similar to such accounts in conventional banks. No interest is paid to depositors of current accounts. Depositors have instant access to those accounts and are able to withdraw money any time they wish. Savings deposits are fixed-term profit-sharing arrangements that cannot be cashed in before maturity date without a substantial

⁴ For example, the Sharjah Islamic Bank in the United Arab Emirates views a fixed charge based on the maximum credit limit as *Sharia* compliant.

⁵ Forbidden activities include, but are not limited to: gambling, production or use of alcohol, and production or consumption of pork products.

⁶ Aslam and Youssef (2000) argue that financial realities of the marketplace lead Islamic banks to use short-term debt instruments so that their capital structure is similar to that of conventional banks. This behavior will make it more difficult to distinguish between conventional and Islamic banks based on accounting ratios alone.

penalty. The profit-sharing ratio of the savings-type deposits depends upon future profits, but expected returns are similar to those of conventional savings deposits of the same maturity.

Islamic banks replace loans with investments that are generally riskier than secured interest-bearing loans. Nevertheless, as shown in Appendix A, investment vehicles such as Musharaka and Mudaraba help reduce the risk in Islamic banking. Entrepreneurs wanting funds under these arrangements must document the feasibility of projects to be undertaken with these funds.

The cost of capital in conventional banks represents the cost of debt and equity. The cost of capital in Islamic banks is replaced by profit and loss sharing by depositors and equity holders in Islamic banks. Return on equity is more variable than for conventional banks, but the default risk of not paying a return to depositors is eliminated under the Islamic banking model. Nevertheless, the failure to reward depositors could lead to a substantial withdrawal of deposits and the risk of bankruptcy.

Each Islamic bank in the GCC has established an in-house “Sharia Committee” to ensure that the Islamic banks’ transactions and activities are in compliance with the teaching of Islam and the *Sharia*. The Sharia committee consists of individuals who are experts in the Islamic *Figh Almuamalat* (Islamic commercial jurisprudence). According to Grais and Pellegrini (2006, p.1–2), the Sharia Committee should have five different activities: 1) “certifying permissible financial instruments through *fatwas*, 2) verifying that the transactions comply with issued *fatwas*, 3) calculating and paying *Zakat*, 4) disposing of non-*Sharia*-compliant earnings and, 5) advising on the distribution of income or expenses among shareholders and investment account holders”. The committee also should issue a report to certify that all financial activities and transactions are in compliance with *Sharia* principles.

3. The GCC banking industry

The GCC region has a rich history of banking going back to 1918 when the British first opened a bank in Bahrain [Wilson (1987)]. The GCC banking industry has several features that make it unique and different from the banking sectors in many other regions. First, the sector is heavily dependent on oil sector activities. Second, the banking industry’s main lending activities are concentrated in construction, real estate, and consumer loans. Third, the industry is heavily protected from foreign competition and dominated by the government. Fourth, banking is one of the largest sectors in GCC economies and there are more bank stocks traded in GCC stock markets than stocks of any other industry.

Several recent articles have examined the structure and performance of the banking industry in the Middle East. For example, Karim and Ali (1989) investigate the effect of the interaction between environmental (competition) and financial strategies adopted by two Islamic banks – Faisal Islamic bank of Sudan and Kuwait Finance House—for the period 1979–1985. They find that Islamic banks rely more upon depositors as a source of capital during periods of economic boom and more upon equity financing in less prosperous periods. Islam (2003) investigates the development and performance of commercial banks in Bahrain, Oman, and the United Arab Emirates for the period 1998–2000. He uses several financial ratios to measure bank performance and shows that GCC banks perform well relative to western banks. This occurs even during a period when competition among GCC banks is increasing.

A second line of research focuses on the profitability of the banking sector in one or more countries. For example, Ahmed and Khababa (1999) study the effects of size, business risk,

and market concentration on the profitability of 11 commercial banks in Saudi Arabia for the period 1992–1997. They employ a regression model using three measures of profitability—return on assets, return on equity, and earnings per share—and show that business risk and size generally explain bank profitability in Saudi Arabia. Murjan and Ruza (2002) examine the competitiveness of commercial banks in nine Arab countries (Bahrain, Egypt, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates). Using a Ross–Poznan test for the period 1993–1999, their study suggests that the banking industry in those countries operates under conditions of monopolistic competition. Essayyad and Madani (2003) examine the concentration, efficiency, and profitability of 10 commercial banks in Saudi Arabia for the period 1989–2001. Their results indicate that the Saudi Arabian banking industry is highly concentrated and has a four-firm concentration ratio ranging between 69% and 87%. They also show that profitability rises with increases in bank efficiency and that bank profits are positively related to oil revenues. Finally, Al-Tamimi and Al-Amiri (2003) examine the service quality of two Islamic banks in the United Arab Emirates (Abu Dhabi Islamic Bank and Dubai Islamic Bank) by distributing questionnaires to 700 customers. About 350 responses were received and they reveal that customers are very satisfied with the quality of services received from these banks.

4. Hypotheses to examine

An examination of previous studies, such as Karim and Ali (1989) and Rosly and Abu Bakar (2003), suggests that GCC Islamic banks may be more profitable than other GCC banks. However, it may be possible that shareholders in Islamic banks are willing to accept a lower return on equity. Assuming that the first possibility is more likely, the following proposition can be tested:

Hypothesis 1. Islamic banks are more profitable than conventional banks.

Based on Rosly and Abu Bakar (2003), we expect Islamic banks to be less efficient than conventional banks. Also, Yudistira (2003) uses data-envelopment analysis to show that 18 Islamic banks (including a few GCC banks) are slightly less cost efficient than conventional banks. The inefficiency may be due to lack of economies of scale due to the smaller size of Islamic banks, or it may arise because customers of Islamic banks are pre-disposed to Islamic products regardless of cost. The hypothesis is stated as:

Hypothesis 2. Islamic banks are less efficient than conventional banks.

Critics of current Islamic financial practices [e.g., Rosly and Abu Bakar (2003), Meenai (2000)] suggest that Islamic banks have often just repackaged conventional products based on semantics. Also, given that Islamic banks operate in the same competitive environment as conventional banks, it is not clear that the two types of banks can be distinguished from one another on financial characteristics alone. The testable propositions from this strand of the literature include:

Hypothesis 3. Financial ratios can be used to distinguish between Islamic and conventional banks in the GCC region over the period 2000–2005.

Hypothesis 4. Linear and non-linear models can be used to distinguish between Islamic and conventional banks in out-of-sample analysis.

Table 1
Number of banks in the sample

	2000	2001	2002	2003	2004	2005	Total observations
Conventional	13	14	29	29	28	28	141
Islamic	12	14	18	18	18	16	96
Total	25	28	47	47	46	44	237

Finally, the proposition from the forecasting literature that non-linear models generally outperform linear models can be tested as follows:

Hypothesis 5. Non-linear techniques better classify banks as Islamic versus conventional in out-of-sample analysis.

5. Data sources and accounting ratios

5.1. Data

Whenever possible, we downloaded annual reports from the websites of each GCC bank. Otherwise, data were obtained from the Institute of Banking Studies (Kuwait). These annual reports contained the income statement, statement of change in stockholders' equity, balance sheet, statement of cash flows, and the notes to the financial statements.

As shown in Table 1, we collected 237 observations, or bank-years of data, for banks operating in the GCC region for the calendar years 2000–2005.⁷ Annual reports prior to 2000 were not readily available electronically and the annual reports for 2006 were not yet available at the time our research was completed.

There are 141 observations for conventional banks and 96 observations for Islamic banks. Our sample contains 25 banks (13 conventional and 12 Islamic) for 2000, 28 banks (14 conventional and 14 Islamic) for 2001, 47 banks (29 conventional and 18 Islamic) in both 2002 and 2003, 46 banks (28 conventional and 18 Islamic) for 2004, and 44 banks (28 conventional and 16 Islamic) for 2005. The data set excludes multinational banks (e.g., HSBC, Citicorp, and ABN-Amro) that operate in the GCC region, but includes all other GCC banks.

5.2. Accounting ratios

Conventional banks in the GCC region have adopted the financial accounting rules established by the International Accounting Standards Board, previously International Accounting Standards Committee [Hussain, Islam, Gunasekaran, and Maskooki (2002)], while Islamic banks use the financial accounting rules established by The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). Those accounting standards are derived from the faith of Islam. Each Islamic bank establishes a Sharia

⁷ Fiscal and calendar years for GCC banks are identical.

committee to monitor and ensure that all bank transactions are in compliance with Islamic laws. There are some differences between AAOIFI standards and IAS standards, such as the more stringent disclosure requirements imposed on conventional banks and prohibition of some activities under AAOIFI standards. However, all banks in the GCC region must comply with the accounting rules and regulations of the country of their incorporation. Since the Central banks in each GCC country have required all banks to follow IAS in preparing financial statements, it should be possible to make meaningful comparisons between the accounting ratios of conventional and Islamic banks.⁸ Also, comparing data across these countries should not cause any particular problems.

The 26 financial ratios used in this study are defined in Table 2. They fall into five general categories: profitability, efficiency, asset quality, liquidity, and risk. Previous studies of the Middle Eastern banking industry have generally focused on profitability and bank efficiency. For example, Rosly and Abu Bakar (2003) examine bank profitability based upon return on assets (ROA), profit margin (PM), and return on deposits (ROD). In addition to these ratios, our profitability measures include return on equity (ROE) and return on shareholder capital (ROSC). Based on previous studies and as stated in Hypothesis 1, profitability ratios should be higher for Islamic banks.

Demirgüç-Kunt and Hizinga (1999) and Essayyad and Madani (2003) focus on the following measure of efficiency: interest spread = interest revenues – interest expenses. It is similar to our net interest margin (NIM) and the interest income to expenses (IEE) ratio. Other bank efficiency ratios for this study include operating margin (NOM), interest income to expenses (IEE), operating expense to assets (OE/A), operating income to assets (OIA), operating expenses to revenue (OER), asset turnover (ATO), net interest margin (NIM), and net non-interest margin (NNIM). From the literature cited above, and as stated in Hypothesis 2, Islamic banks are expected to be less efficient than conventional banks.

The asset-quality indicators – provisions to earning assets (PEA), adequacy of provision (as per Table 2) for loan (APL), and the write-off ratio (WRL) – indicate how banks manage assets. Larger PEA or APL ratios indicate greater reserves for bad loans or unforeseen emergencies and probably reflect lower risk. However, another possible explanation could be that banks maintain allowances for loan losses in direct proportion to expected losses. A priori, we expect that Islamic banks may be riskier than conventional banks, but we have no strong expectations regarding how the asset-quality ratios vary between Islamic and conventional banks.

The final five ratios – cash to assets (CTA), cash to deposits (CTD), loans to deposits (L/D), total liabilities to equity (TLE), and total liabilities to shareholder capital (TLSC) – are somewhat similar to the asset-quality indicators. If Islamic banks are riskier than conventional banks, they may hold more cash relative to assets or deposits. Since Islamic banks do not use debt financing, we would expect shareholder equity to be a larger source of funds relative to conventional banks. Therefore, TLE and TLSC should be smaller for Islamic banks.

⁸ We examined the notes section of the financial statements to determine whether each bank was in compliance with IAS. The two Islamic banks in Qatar did not comply with IAS prior to 2004, so these observations were deleted from the sample.

Table 2
Definitions of 26 financial ratios

Bank profitability ratios

1. ROA = return on assets = NI / ATA = net income / average total assets
2. ROE = return on equity = NI / SE = net income / average stockholders' equity
3. PM = profit margin = NI / OI = net income / operating income
4. ROD = return on deposits = NI / ATD = net income / average total customer deposits
5. ROSC = return on shareholder capital = NI / SC = net income / shareholder contributed capital
6. NOM = net operating margin = OI / IN = operating profit or income / interest income

Bank efficiency ratios

7. IEE = interest income to expenses = $(IN - IF) / ATIA$ = (interest income - interest expenses) / average total loans and advances
8. OEA = operating expense to assets = OE / ATA = operating expenses / average total assets
9. OIA = operating income to assets = OI / ATA = operating income / average total assets
10. OER = operating expenses to revenue = OE / OI = operating expenses / operating income (revenue)
11. ATO = asset turnover = IN / ATA = interest income / average total assets
12. NIM = net interest margin = $(IN - IF) / ATA$ = (net interest income - net interest expenses) / average total assets
13. NNIM = net non-interest margin = $(NIN - NIE) / ATA$ = (net non-interest income - net non-interest expenses) / average total assets

Asset-quality indicators

14. PEA = provision to earning assets = PI / I = ATLA = provision for loan losses / average total loans and advances
15. APL = adequacy of provision for loans = $ALL / ATLA$ = allowance for loan losses at the end of the year / average total loans and advances
16. WRL = write-off ratio = $WR / ATLA$ = write-off of loans during the year / average total loans and advances
17. LR = loan ratio = $ATLA / ATA$ = average total loans and advances / average total assets
18. LTD = loans to deposits = $ATLA / ATD$ = average total loans and advances / average total customer deposits

Liquidity ratios

19. CTA = cash to assets = C / ATA = cash / average total assets
20. CTD = cash to deposits = C / ATD = cash / average total customer deposits

Risk ratios

21. DTA = deposits to assets = ATD / ATA = average total customer deposits / average total assets
22. EM = equity multiplier = ATA / SE = average total assets / average stockholders' equity
23. ETD = equity to deposits = SE / ATD = average shareholders' equity / average customer total deposits
24. TLE = total liabilities to equity = TL / SE = average total liabilities / average stockholders' equity
25. TLSC = total liabilities to shareholder capital = TL / SC = average total liabilities / shareholder contributed capital
26. RETA = retained earnings to total assets = RE / ATA = retained earnings / average total assets

Averages for any variable are the beginning of period value plus the end of period value divided by two. They are defined the same way for both conventional and Islamic banks.

Net income for Islamic banks is conventional net income before taxes, plus Zakat.

Interest income and expenses are replaced by commission income and expenses for Islamic banks. Similarly, investments in Mudaraba, Murabaha, and Musharaka are equivalent to loans and advances.

We have not yet explained how certain ratios are calculated for Islamic banks. Turen (1995, p. 12) provides an excellent explanation of the differences between Islamic banks and conventional banks. He suggest that "(T)he risk level of an Islamic bank is the combined effect of the three new statutes governing the operations of the institutions, namely deposit holders are replaced by equity holders, interest payments to depositors are converted into profit and loss sharing and loans to customers are transformed into capital participation". Most variables are defined the same way for both categories of banks.

However, net income for Islamic banks includes conventional net income before taxes, plus Zakat, which is a tax on idle wealth.⁹ Interest income and expenses are replaced by commission income and expenses. Finally, investments in Mudaraba, Murabaha, and Musharaka are essentially equivalent to loans and advances and are treated that way in calculating the financial ratios.

6. In-sample results and interpretation

6.1. Descriptive statistics

To begin the investigation of whether Islamic and conventional banks can be distinguished from one another on the basis of their financial characteristics, Table 3 presents descriptive statistics for both types of banks. The last column of the table shows the results of a *t*-test for equality of means between the Islamic and conventional group of banks for each of the 26 financial ratios. The test statistic and degrees of freedom are calculated assuming unequal, rather than equal, population variances because the variances of about a third of the financial ratios are more than twice as large for one group of banks than the other group.¹⁰ Overall, 10 ratios have means that are statistically different between the two types of banks. The mean values for ROA, NOM, ATO, and RETA are significantly different at the 10% level between the two types of banks, while the means of four ratios (ROE, NOM, ATO, and RETA) are also significantly different at the 5% level.

Consistent with the prediction in Hypothesis 1, the six profitability ratios confirm the work of previous authors that Islamic banks are more profitable than conventional banks. For example, Rosly and Abu Bakar (2003) reported higher ROA for Islamic banks. In this study the ROA of 2.4% for Islamic banks versus 2.0% for conventional banks is significantly larger at the 10% level. ROE averages 18.2% annually for Islamic banks versus 14.4% for conventional banks. The difference is significant at the 1% level. Karim and Ali (1989, p.193) state that Islamic banks “opt for an increase in investment deposits rather than equity capital to fund their investments” under conditions of “high strategic choice”. During the financial boom experienced in the GCC in recent years, it makes sense for Islamic banks to rely more upon deposits than equity. This explains the higher ROE for Islamic banks. Another measure of profitability, the net operating margin (NOM), is more

⁹ Zakat is a mandatory religious levy imposed on all Muslims beginning with the year 624 A.D. It is still in use today and can be imposed at a 2.5% annual rate on idle wealth above some threshold level.

¹⁰ The test statistic (*t*) is approximately the same as for the simpler case of equal variance where both samples are assumed to come from the same population. Hence, $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_p^2 (\frac{1}{n_1} + \frac{1}{n_2})}}$, where \bar{x}_1 and \bar{x}_2 are the means of a financial ratio for Islamic banks (group 1) and for conventional banks (group 2), s_1 and s_2 denote standard deviations, and n_1 and n_2 are the number of observations for each group of banks. Degrees of freedom for the test statistic are adjusted downward and critical values increase as the difference between the variances of the two samples increases. Degrees of freedom (*df*) are calculated as:

$$df = \frac{s_1^2 n_1 + s_2^2 n_2}{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

Table 3
Descriptive statistics for the 26 financial ratios

Variable	N	Mean		Standard deviation		t-test for equality of means		
		Conventional	Islamic	Conventional	Islamic	Conventional	Islamic	t-value
ROA	141	96	.020	.024	.016	.016	1.889 ^a	.06
ROE	141	96	.144	.182	.106	.095	2.883 ^b	.004
PM	141	96	.553	.526	.366	.333	-.589	.278
ROD	141	96	.037	.046	.039	.049	1.504	.234
ROSC	141	96	.464	.459	.413	.305	-.107	.903
NOM	141	96	1.064	2.415	1.044	3.993	3.241 ^b	.002
IEE	141	96	.061	.074	.144	.151	.663	.508
OEA	141	96	.021	.024	.022	.024	.977	.331
OIA	141	96	.044	.050	.027	.029	1.608	.11
OER	141	96	.486	.477	.319	.173	-.28	.309
ATO	141	96	.057	.040	.085	.017	-2.308 ^b	.022
NIM	141	96	.034	.024	.074	.014	-1.564	.121
NNIM	141	96	.011	.002	.077	.021	1.903 ^a	.055
PEA	126	75	.012	.009	.016	.007	-1.831 ^a	.069
APL	126	75	.084	.064	.098	.060	-1.795 ^a	.074
WRL	126	75	.011	.010	.024	.022	-.301	.764
LR	141	96	.527	.52	.203	.215	-.252	.801
LTD	141	96	.859	1.032	.215	.901	1.846 ^a	.068
CTA	141	96	.070	.060	.068	.062	-1.172	.243
CTD	141	96	.115	.157	.109	.317	1.249	.214
DTA	141	96	.629	.639	.271	.196	.33	.743
EM	141	96	7.741	8.469	3.192	3.499	1.629	.105
ETD	141	96	.298	.332	.306	.402	.702	.239
TLE	141	96	6.755	6.833	3.000	3.743	.17	.864
TLSC	141	96	19.314	16.149	10.880	9.146	-2.42 ^b	.016
RETA	141	96	.017	.007	.025	.011	-4.191 ^b	.000

The t-test for equality of means is based on the mean for Islamic banks minus that of conventional banks for each financial ratio. The test is calculated assuming unequal sample variances.

^a Denotes significance at the 10% level.

^b Denotes significance at the 5% level.

than twice as large for Islamic banks relative to conventional banks and the difference is significant at the 1% level.

Efficiency ratios differ somewhat between the types of banks, but not as dramatically as the profitability ratios. The means of two efficiency ratios are significantly different between types of banks. Asset turnover (ATO), which is interest or commission income divided by average total assets, is significantly smaller for Islamic banks at the 5% level. The net non-interest margin (NNIM) is significantly larger for Islamic banks at the 10% level. These results occur because conventional banks are dependent upon interest income earned on loans, while Islamic banks are less dependent upon the Islamic equivalent fees and commissions. Islamic banks obtain a larger portion of net income from non-interest equivalent sources.

The asset-quality indicators reveal some additional differences between Islamic and conventional banks. The PEA (provision for loan loss divided by total loans) and APL

(allowance for loan loss divided by total loans) ratios are significantly smaller at the 10% level for Islamic banks. Conventional banks maintain higher reserves for loan losses, but the interpretation is unclear. For example, Ijara and various Islamic leaseback schemes may involve less risk than conventional loans, so less reserve is needed. Alternatively, Islamic banks may be operating with greater risk because they maintain smaller contingency reserves for bad loan-like products.

The liquidity ratios are not significantly different between types of banks, but Islamic banks keep more cash relative to deposits and less relative to assets than conventional banks.¹⁰ In contrast, the risk ratios indicate some important differences in operational characteristics. Islamic banks extend more loans or equivalents relative to deposits (LTD) than conventional banks. The difference is significant at the 10% level and may suggest greater risk for Islamic banks. Total liabilities to shareholder capital (TLSC) are significantly smaller at the 2% level for Islamic banks – perhaps because of the greater reliance upon initial shareholder capital in Islamic banks. This makes the denominator larger and the TLSC ratio smaller for Islamic banks. By itself, this ratio suggests that Islamic banks are less risky than conventional banks. The retained earnings to total assets ratio (RETA) has the largest *t*-statistic for any of the ratios. It is statistically smaller for Islamic banks at the 1% level. Islamic banks tend to distribute profits rather than retain them. In contrast to the TLSC ratio, RETA suggests that Islamic banks may be riskier than conventional banks. Finally, note that the equity multiplier (EM) is larger for Islamic than for conventional banks, but only significant at the 10.5% level. Since $ROE = ROA \times EM$, this ratio illustrates that Islamic banks use deposits as a type of leverage to achieve a higher ROE. Higher equity multipliers suggest higher risk, but this type of leverage means the risk is also shared with depositors. The risk is reflected in a higher (but not statistically significant) return on deposits (ROD) for Islamic banks. Even though Islamic banks do not raise capital with debt, they may be riskier than conventional banks. Greater risk may explain the higher profitability of Islamic banks.

6.2. Logit model

To further explore the relationship between the financial ratios for the two types of banks, we run a logistic regression (logit) using the 26 financial ratios for all 237 observations in the dataset. The dependent variable to be predicted is a categorical variable taking on the value of one for an Islamic bank and zero for a conventional bank. Some of the 26 variables are not significant in distinguishing between type of bank, and some combinations of variables are highly correlated with one another.¹¹ Recognizing and adjusting for possible problems with

¹⁰ Ghosh and Zaman (2007) reports that Islamic banks and found no presence of Cash Waqf. *Waqf* is the locking of assets, immovable or movable assets. A *Waqf* asset cannot be disposed of and its ownership cannot be transferred. Its ownership is vested in Allah and the assets are used for charitable purposes, mainly charitable in nature. *Waqf* is common in other Islamic countries, such as Bangladesh, Indonesia, and Pakistan.

¹¹ For example, the return on assets (ROA) and return on equity (ROE) are highly correlated since ROE equals net income, only one of the almost identical earnings (EM) or NNIM can be included in any single logit regression model. Similarly, the return on assets (ROA) and EM are highly correlated and creating problems when all three variables are included in any

multicollinearity of variables, stepwise logit is used to form a parsimonious predictive model that shows the probability (P_i) from zero to one that a given bank ($i=1, 2, \dots, 237$) is Islamic rather than conventional. For the 26 possible financial ratios ($n=1, 2, 26$), stepwise logit selects the n statistically significant ratios or variables (F_i) that help to distinguish between the two categories of banks. At each observation, the logit probabilities are represented by

$$\text{Logit } P_i/[1 - P_i] = \alpha + \sum_{i=1}^n \beta_i F_i + \varepsilon_i \quad (1)$$

where α is the constant term, and the β terms are the slope coefficients in the estimated logit model.

The best explanatory model was selected using a variant of stepwise logit contained in the XL Data Miner software. An exhaustive search was performed across all combinations of variables to find the best one-variable model, then the best two-variable model, etc. up to the best 24-variable model (inclusion of more than 24 variables led to estimation problems due to the presence of multicollinearity). Each of these 24 models was selected by maximizing the log of the likelihood function. Then, these models were compared with the results of backward and forward elimination using a 5% cutoff rule within stepwise logit.¹¹ Multicollinearity was deemed to be a problem if the addition of a significant new variable to a model noticeably reduced the explanatory power of a previously included variable, or when working downward from large models, if the deletion of one significant variable caused a previously significant variable to lose its significance. Forward and backward elimination and comparison of the results from an exhaustive search eventually led to following five-variable explanatory model:

$$\text{Bank} = -8.17 \text{ROE} + 2.27 \text{OEA} - 49.54 \text{PEA} - 0.62 \text{TLSC} - 10.08 \text{RETA} + \varepsilon \quad (2)$$

(4.96) (2.11) (16.1) (1.08) (1.00)

The t -statistics are shown in parentheses below their respective coefficients, subscripts for individual banks (i) are omitted, and ε is the error term for the regression. The success rate, or classification accuracy, for this model is 77.2% (LLF = +133.5).¹² These results are consistent with Hypothesis 3 – that financial ratios can be used to distinguish between Islamic and conventional banks.

All coefficients in this five-variable model have the expected sign. The positive coefficient for ROE confirms expectations that Islamic banks are more profitable and therefore, reward shareholders with higher returns than conventional banks. This result supports Hypothesis 1. The positive coefficient for OEA confirms that operating expenses to assets are higher for Islamic banks – supporting Hypothesis 2. The negative sign for PEA reflects the smaller reserves for loan losses in Islamic banks. This may suggest that Islamic banks take on greater risk by maintaining smaller contingency funds for possible losses on

¹¹ Ignoring multicollinearity and working upward from a one-variable model or downward from a 24-variable model using a 5% cutoff rule leads to a 14-variable model with all coefficients significant at the 1% level. The LLF = +86.5 and the in-sample classification rate is 83.2%. The variables included were ROE, PEA, TLSC, OEA, ATO, CTA, CTD, ROSC, NIM, PM, DTA, TLSC, and RETA.

¹² No variables in this model are more than 28% correlated with one another. Allowing 5% multicollinearity yields a 6-variable model with an 80% in-sample classification rate.

loan-like products. Alternatively, although perhaps less likely, lower reserves may reflect lower probabilities of default for Islamic products. The negative sign on TLSC (which is total liabilities relative to shareholder capital) arises because of the lack of debt financing in Islamic banks. By itself, this ratio suggests that Islamic banks are less risky than conventional banks because of their reliance on shareholder capital. Finally, the negative coefficient on RETA arises because Islamic banks generally pay higher dividends to shareholders and do not maintain high levels of retained earnings. It suggests that Islamic banks may be riskier than conventional banks in the GCC.

7. Out-of-sample models and results

The true test of predictive power for any model should be based on out-of-sample forecasting ability. That is, any classification model should be judged on the basis of the success that it has when presented with new data that has not already been used to optimize the in-sample classification rate. Most models perform noticeably worse out-of-sample than within sample.

A substantial body of literature suggests that non-linear forecasting models outperform linear techniques. For example, a survey article by Krishnaswamy, Gilbert, and Pashley (2000) indicates that neural networks have enjoyed considerable success in forecasting stock prices, currency movements, interest rate changes, and in developing trading systems. Neural networks have performed particularly well in classification exercises such as identifying financially distressed firms, for mimicking bond-rating classifications, or in distinguishing good and bad credit risks. Similarly, Knez and Ready (1996) have shown that non-linear, non-parametric regression techniques (such as kernel regression) outperform linear regression in certain situations. However, the superiority of non-linear techniques has been refuted in some forecasting studies. Olson and Mossman (2001), for example, find that linear regression performed better out-of-sample than either non-parametric regression or neural networks.

The most common method of evaluating forecasting models is to divide the data set into a training, or in-sample set of observations, and to use the remainder of the data as an out-of-sample, or testing set. The forecasting model is optimized on the training data and tested on the out-of-sample data. This procedure provides fair evaluations for linear forecasting techniques, but not for non-linear methods in some situations. Neural networks and some other non-linear techniques often suffer from problems of overfitting. The models can usually be made complicated enough and trained long enough to obtain 100% within-sample classification accuracy, but such overfitted models generally have little predictive power out-of-sample. Numerous techniques exist to avoid overfitting – such as randomly sampling blocks of data, stopping the convergence algorithms at higher levels of tolerance, re-introducing error or bias after some specified number of iterations, limiting the number of iterations, etc. Researchers often adopt one or more of these methods, but the problem is that the training set usually provides little guidance as to which method to use.

Perhaps the best procedure for evaluating competing non-linear forecasting models is to divide the data set into three separate groups of observations – a training set, a validation set, and a testing set. Models are initially optimized on the training set and then applied to the validation data. Feedback errors from the validation data set are used to recalibrate the

parameters of the classification model. After the various models are optimized on the validation data, the best of each type of model (e.g., neural nets, nearest neighbors, or logit) is compared to the other models using the testing data set. This procedure truly provides out-of-sample tests of classification models.

In this paper, we randomly selected 50% of the 237 observations for the training data and 30% of the observations for the validation sample. Classification accuracy and model comparisons are made using the remaining 20% of the observations. Experimentation by randomly selecting 20% of the observations for the validation set and 30% for the testing set led to nearly the same results as presented below.

7.1. Neural network models

A feed-forward back propagation neural network can be constructed for the same classification problem shown in Eq. (1). The neural network corresponding to Eq. (2) can be represented by

$$\text{Bank}_i = \alpha + \sum_{h=1}^H \phi_h F\left(\gamma_h + \sum_{j=1}^n \beta_{hj} I_{ij}\right) + \varepsilon_i, \quad (3)$$

where H is the total number of hidden units or neurons in the hidden layer between inputs and outputs, γ_h are input threshold terms, β_{hj} are weights from the data inputs to the hidden layer, and the ϕ_h parameters are weights from the hidden layer to the output layer. Non-linearities are introduced by passing the financial-ratio variables through a hyperbolic tangent-transformation function, as represented by $F(\cdot)$. Denoting $z = (\gamma_h + \sum_{j=1}^n \beta_{hj} I_{ij})$ in Eq. (3), the hyperbolic transformation or activation function is $F(z) = (e^z - e^{-z}) / (e^z + e^{-z})$. By iterating within sample and examining the error terms in Eq. (3), the neural network readjusts the input weights (β_{hj}) and output weights (ϕ_h) to maximize the classification rate for classification models.

7.2. *k*-means nearest neighbors

The *k*-means nearest neighbor clustering algorithm is a non-linear, non-parametric technique that essentially clusters together banks with similar financial characteristics. It can be thought of as the categorical equivalent of the nearest neighbor regression technique, which itself is similar to the kernel density non-parametric regression model. The *k*-means nearest neighbor classification algorithm selects scaling factors and pairs each data point with one or more observations in the training set in order to minimize the Euclidian distance function between any two banks (or groups of banks). This distance function is denoted by $d(\text{Bank}_i, \text{Bank}_k)$ and the goal is:

$$\text{Minimize } d(\text{Bank}_i, \text{Bank}_k) = \sqrt{\sum_{j=1}^n w_j \left(I_{ij} - (1/K) \sum_{k=1}^K I_{ik} \right)^2}. \quad (4)$$

The function being minimized is a weighted average of the differences between the financial ratios of Bank_i and one or more other banks labeled as Bank_k . I_{ij} represents one of the n financial ratios for Bank_i , I_{ik} represents the same ratio for bank k within a group of K nearest

neighbors. Finally, w_j is a weighting function for the importance of financial variable V_{jk} . The values for w_j and the number of the K nearest neighbors is first optimized for the training set and then recalibrated based upon maximizing the classification rates for the validation data.

7.3. Out-of-sample results

Each type of classification model was trained and then optimized on the validation data. For out-of-sample tests, multicollinearity of variables is not a major problem unless it leads to overfitting and poor generalization ability. Judging logit models based upon performance in the validation sample, models with between 10 and 17 variables performed similarly. The best model was obtained using a 10% cutoff rule in the training set, and led to the inclusion of 15 variables. The best logit model achieved an in-sample classification rate of 87.3%, 85.9% for the validation data, and 85.4% (error rate = 14.6%) for the out-of-sample test data.¹⁵ Consistent with Hypothesis 4, a linear classification model can be used to categorize banks as Islamic or conventional in an out-of-sample test.

Non-linear techniques performed similarly among one another for between 12 and 20 input variables. The best neural network model consisted of 15 input variables. The data were normalized and the best back propagation model consisted of 25 nodes in each of two hidden layers, with iterations stopped after 1000 epochs. It classified correctly 98.3% of the training data and 90.1% of the validation data. Out-of-sample, the classification rate for the testing data was 91.7% (error rate = 8.3%).

The best k -means nearest neighbors model selected $K=1$ as the optimal number of nearest neighbors. It achieved an in-sample classification rate of 100% and 93.0% for the validation data. Out-of-sample, its classification rate was the same as for the best neural network model – 91.7% (error rate = 8.3%). In general, the k -means classifier should be preferred to the neural network classifier because it is much easier to use. It only needs to be run once, whereas the neural network model may have to be run 10 to 20 times with various parameter values to find the best model. Even then, the best neural network model only just matches the performance of the k -means nearest neighbor classifier.

To determine whether the classification rates for the k -means, neural network, and logit models are statistically significant, a directional accuracy test developed by Pesaran and Timmermann (1992) is employed. The Pesaran–Timmermann (PT) statistic is based on the percentage of correctly classified items minus the percentage correctly classified by chance alone scaled by the difference in variances of these proportions. In the limit, as the number of forecasts made (N) tends to infinity, the PT statistic is normally distributed with mean zero and variance one. The PT statistic is given by:

$$PT = \frac{(p - p^*)}{\sqrt{[\text{var}(p) - \text{var}(p^*)]}}. \quad (5)$$

¹⁵ We also examined the forecasting performance of two models not expected to outperform their relative linear and non-linear counterparts. Linear discriminant analysis (DA) provided an out-of-sample classification rate of 79.2% for the best 15-variable model, versus 85.4% for logit. The best non-linear classification and regression tree (CART) model yielded an out-of-sample classification rate of 87.5%, versus 93.7% for both the neural network and the k -means models.

For this statistic, p is the proportion of times that the sign of the forecast is correct, or in our case, the percentage of times that a bank was correctly classified. The proportion of forecasts that would be correct due to chance alone is $p^* = p_1 p_2 + (1 - p_1)(1 - p_2)$, where p_1 is the proportion of times that a bank is actually Islamic in the test data and p_2 is the proportion of times that the bank is forecast to be Islamic. Similarly, the notation $(1 - p_1)$ and $(1 - p_2)$ refers to actual and forecasted proportions for conventional banks. Sample variances are obtained assuming that the number of correct sign predictions follows a binomial distribution, so that:

$$\begin{aligned} \text{var}(p) &= p^*(1 - p^*)/N \quad \text{and} \\ \text{var}(p^*) &= (2p_1 - 1)^2 p_2(1 - p_2)/N + (2p_2 - 1)^2 p_1(1 - p_1)/N \\ &\quad + 4p_1 p_2(1 - p_1)(1 - p_2)/N^2. \end{aligned}$$

The PT statistics are 4.63 for either of the non-linear techniques and 3.82 for the logit classification model. Based on a one-tail test, the PT statistics are significant at the 1% significance level. These statistics support Hypothesis 4, indicating that accounting ratios can be used in new out-of-sample data to meaningfully distinguish between Islamic and conventional banks in the GCC region.

Following Coats and Fant (1993), a test of proportions can be used to determine whether the forecasting accuracy of one classification model is significantly better than that of another. Denoting p_{KM} as the percentage of test cases correctly forecasted by k -means, p_L as the percentage of sample observations correctly identified by logit, and P_L and P_{KM} as population proportions, the null hypothesis is that the population proportion correctly forecasted by k -means is no larger than the proportion forecast correctly by logit, or that: $H_0: P_L \geq P_{KM}$.

A one-tailed test of two sample proportions is normally distributed and the test statistic is:

$$Z = \frac{(p_{KM} - p_L) - 0}{\sqrt{\frac{p_{KM}(1 - p_{KM})}{N} + \frac{p_L(1 - p_L)}{N}}}. \quad (6)$$

The Z-statistic for k -means versus logit difference in proportions classified is .97. It is not significant at even the 10% level. With only 48 out-of-sample observations, the classification rate of 91.7% for k -means or neural networks versus 85.4% for logit may be important, but it is not statistically significant.¹⁶ Our results provide mild support for Hypothesis 5 – that non-linear techniques are better classifiers than linear models. However, non-linear classification techniques do not significantly outperform the best linear model in distinguishing between Islamic and conventional banks in the GCC region in out-of sample tests.¹⁷

¹⁶ If the same proportions between k -means and logit prevailed as sample size increased, an out of sample data set of at least 144 observations would be needed to say that non-linear techniques out perform logit at the 5% significance level. Also, relative to the 79.2% classification rate for the linear discriminant-analysis model (which is known to not perform as well as logit), both k -mean nearest neighbors and neural network models provide classification rates that are significantly better at the 5% level – consistent with Hypothesis 5.

¹⁷ However, if logit is replaced by the older and the slightly inferior technique of linear discriminant analysis, Hypothesis 5 is supported. The classification rates for both k -mean nearest neighbors and neural network models relative to the 79.2% classification rate for the linear discriminant-analysis model are significantly better at the 5% level.

8. Summary and conclusion

The empirical results of this study indicate that measures of bank characteristics such as profitability ratios, efficiency ratios, asset-quality indicators, and cash/liability ratios are good discriminators between Islamic and conventional banks in the GCC region. Such findings are consistent with the literature on corporate failure, credit rating, and assessment of risk that also shows that accounting numbers are useful for classifying firms within the same industry into two or more categories based on financial characteristics. Thus, accounting information is useful not just in developed economies, but also in the developing countries of the GCC region.

An initial glance at the data reveals that most accounting ratios are similar for Islamic and conventional banks. This result seems logical since both types of banks operate in the same industry in the same region of the world. It is consistent with central-bank regulations in the GCC region that impose similar regulations on all banks. For example, financial-reporting rules and the Basel capital requirements are the same for all banks. Nevertheless, some financial characteristics of Islamic banks are different from those of conventional banks. The best logit model correctly classified about five out of every six banks in out-of-sample tests, while non-linear classification technique correctly classified a bank as Islamic or conventional in about 11 out of every 12 cases.

Results from our classification models imply that the operational characteristics of the two types of banks may be different. Islamic banks are more profitable than conventional banks, but probably not quite as efficient. Some of the higher profitability of Islamic banks may be due to risk, while the remainder may be due to the greater reliance on deposits for providing capital. Islamic banks voluntarily hold more cash relative to deposits than conventional banks due to the risk of withdrawal of deposits, but they also maintain lower provisions for possible loan losses (or losses from *Ijara* leasing and investments for Islamic banks) than conventional banks. Favorable economic conditions in the GCC since the advent of Islamic banking may have masked the unique risks faced by Islamic banks. If these banks are indeed riskier, they may need more careful monitoring and perhaps should be subject to different capital requirements than conventional banks. Such views have also been expressed by Ainley (2000) in "A Central Bank's View of Islamic Banking" where he notes that Islamic banks deal in new and unfamiliar forms of finance where assets are long-term and illiquid. In response, regulators may need to impose higher capital requirements on Islamic banks—particularly during the early years of Islamic bank operations.

Each Islamic bank must currently establish a *Sharia* committee to ensure that it complies with Islamic principles; however, these individual committees do not ensure that Islamic banks as a group have prepared for the risks unique to Islamic banking. There may be a role for central banks in the region to monitor Islamic banks separately from conventional banks and to adopt specific regulations for Islamic banks. For example, the central bank could establish a *Sharia* committee within an Islamic division to ensure *Sharia* compliance nation-wide, and to advise banks on modes, procedures, law, and regulations for Islamic banking. The central bank might arrange for an accounting firm to conduct *Sharia*-compliant audits of Islamic banks, and to create a *Sharia* audit manual. Flexible, but differential, regulation may increase the confidence of depositors and investors

in Islamic banks, provide proper asset/liability management incentives, and maintain financial stability in the GCC banking industry in the future.

The limitations of our study include the following. We did not include market-related variables in distinguishing between Islamic and conventional banks. More and more GCC banks are becoming publicly traded, so future research could incorporate market-based accounting ratios to distinguish between types of banks. Another problem, common to most prediction studies, is that the selection of the variables was not based on any economic theory. Although this study considered six years of data, the time period of analysis is still relatively short and only involves years during an economic boom in the GCC region. As the Islamic banking sector matures, and given that 2006 and 2007 have witnessed the possible bursting of a stock market bubble in the region, results might change as more years of data are collected. Also, the scope of the analysis could be broadened to consider banks in other Muslim countries and to make comparisons between Islamic banks across countries. Finally, it would be interesting to examine whether the financial ratios presented in this paper could be used for risk assessment, forecasting bank profitability, or providing early warning signals of banking problems in various countries.

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Appendix A: Islamic investment vehicles

Mudaraba

An Islamic bank provides funds to a borrower (entrepreneur) who has ideas and expertise to use the funds in productive activities. Profit is shared between the two parties based on an agreed upon ratio. Loss is borne by the provider of the funds—in this case the Islamic bank. The bank is a passive partner.

Musharaka

An Islamic bank provides part of the equity plus working capital for a specific project and shares in profits and/or losses. The bank provides the funds and becomes an active, or management partner. An Islamic bank finances the purchase of goods or commodities in return for a share in the profits realized. Specifications are provided by the purchaser.

Murabaha

An Islamic bank buys an asset on behalf of its client and then sells the same asset to its client after adding a mark-up to the purchase price.

Ijara

The Islamic bank purchases a piece of equipment selected by the entrepreneur and then leases it back to him; he pays a fixed fee.

Ijara wa iktina

The transaction resembles *Ijara*, except that the client is committed to purchase the equipment at the end of the rental period.

Bai at salam

A contract for sale of goods where the price is paid in advance and the goods are delivered in the future.

Istisna

A contract to acquire goods on behalf of a third party. The price is paid to the manufacturer in advance and the goods are produced and delivered at a later date.

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Development of accounting in Iran

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Abstract

The main purpose of this paper is to show the origin, growth and practice of accounting in Iran plus analysis of influential factors such as financial markets, tax policies, privatization, membership in the World Trade Organization, foreign investment, and legal systems. Documents of ancient Iran show that in 550 B.C. (Achaemenid era), all records of public revenues and costs were kept soundly and with remarkable accuracy. These documents display the relentless progress and development of accounting in Iran up until now (pre-Islamic era, post-Islamic era, and contemporary era). During the past two decades, various measures have been adopted to promote and advance accounting in Iran via harmonizing the domestic accounting practices with International norms and standards. Although Iran has employed International Accounting Standards as the basis for developing its National Accounting Standards, there are still some differences between Iranian and international standards, and there are some certain International Accounting Standards that are not applicable in Iran. A host of endemic factors, such as existing laws and rules, religious beliefs, culture, economic and political conditions, have influenced the National Accounting Standards setting processes.

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Keywords: Iran; Corporate Governance; Accounting history; Iranian National Accounting Standards (NASs); Accounting practice

1. Introduction

Recent improvements in information and financial technology have focused attention on the ideas of global business strategy and alliances. How well the outside world understands

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the business practices of a particular country could determine the difference between a successful and a failed outcome— especially if the country is an emerging economy such as Iran (Ashraf & Ghani, 2005). An essential part of this understanding is to determine how a country's business entities measure, summarize, and finally report their economic transactions to their stakeholders. This paper focuses on the origin and development of accounting in Iran with emphasis on the factors that have influenced accounting disclosures and practices.

Earlier research focused on the development, variety, and classification of accounting practices of different groups of countries.¹ A recent review of the accounting literature reveals that the level of economic development, the nature of business enterprises and their relationship with providers of capital, political and economic ties, legal system (common vs. code law), tax laws, inflation levels, and level of education, are important environmental factors that influence accounting practices.²

Islamic nations have been mostly left out of the research on accounting development (Meek & Thomas, 2000). This study contributes to the literature by focusing on the development of accounting in Iran, an Islamic Republic with a long history in accounting and auditing. Because of its natural resources and new petrochemicals industries, for example, Iran also offers ample investment opportunity to foreign investors who wish to diversify their risks by investing in capital markets of other countries.

This paper is organized as follows. Section 2 focuses on social and economic indexes in Iran. The paper next presents a history of accounting in Iran (Section 3) followed by a look at the factors affecting the development of accounting in Iran (Section 4) including financial markets, tax policies, privatization, membership in the World Trade Organization (WTO), and foreign investment. The history of accounting standards and the current standard-setting processes in Iran is discussed in Section 5, and Section 6 concludes the paper.

2. Islamic Republic of Iran — an introduction

Iran, a nation of more than 69 million people, is situated in west Asia, in a region commonly referred to as the Middle East. Geographically, Iran's surface area is 1,648,195 km. Iran is a country with rich resources of oil and gas and other natural reserves. However, it is considered a developing country.³ In recent decades, Iran's population has been growing at an alarming rate and Table 1 shows the population and its growth from 1978 to 2006.

The majority of Iran's population lives in urban areas, and relies on an oil-based economy. Wheat, rice and date are the main agricultural products. At the time of the 1979 Islamic revolution, Iran had already enjoyed almost two decades of rapid economic growth as well as huge changes in her social structures. The country attracted a number of multinational companies, some of which were listed on the Tehran Stock Exchange (TSE). After the Islamic revolution, Iran changed course considerably and established new social,

¹ Such as DaCosta, Bourgeois, & Larson, 1978, Douppnik, 1987, Frank, 1979, Nair & Frank, 1980

² Such as Douppnik & Salter, 1995, Gernon & Meek, 2001, Meek & Saudagaran, 1990, Mueller, 1967

³ The World Bank defines a "developing country" as one whose average per capita income did not exceed U.S. \$ 9266 in 1999.

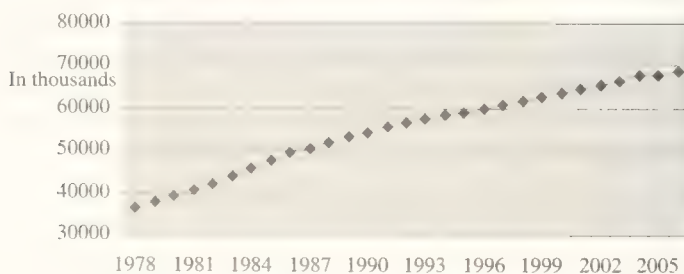
Table 1

Panel A Iran's population growth rates (in millions). Panel B Population and population growth rate in Iran (in thousands)

Panel A: Iran's population growth from 1978 through 2006

Year	Population (in thousands)	Growth	Year	Population (in thousands)	Growth
1978	36,332	.038	1992	56,656	.015
1979	37,730	.038	1993	57,488	.015
1980	39,192	.038	1994	58,331	.015
1981	40,718	.039	1995	59,187	.015
1982	42,313	.039	1996	60,055	.015
1983	43,979	.039	1997	60,937	.015
1984	45,721	.039	1998	61,831	.015
1985	47,541	.040	1999	62,738	.015
1986	49,445	.040	2000	63,658	.015
1987	50,650	.040	2001	64,592	.015
1988	51,890	.024	2002	65,540	.015
1989	53,167	.024	2003	66,480	.015
1990	54,483	.025	2004	67,410	.014
1991	55,837	.025	2005	68,018	.010
1992	56,656	.015	2006	69,000	.014

Panel B: Iran's population during 1978–2006



Source: The site of Iranian's statistics information (<http://www.sci.org.ir>).

economic, and political structures. The overthrow of the Shah's government and the installation of the Islamic Republic of Iran reflect instabilities in the direction of political power. Under the Islamic system, Iran's government focused its policy on achieving the multiple objectives of social justice, modernization, and Islamic institutions.

Gross national product (GNP) has increased during the last quarter of the past decade (excluding changes in oil prices). However, if one considers oil prices, there is no increase in GNP. Table 2 shows the related process after the Islamic revolution.

Because of its special economic structure, foreign trade has always been one of the most important components of economic development in Iran. The people in charge of Iran's economy have been trying to balance foreign export and import figures for years, but there has been no agreement on a single plan for balancing foreign trade. Ever since the discovery of oil in Southern Iran, a reduction of the country's dependence on "black gold" and an increase of non-oil exports has been the subject of much debate and discussion. Numerous plans have been proposed to that end. Although the foreign trade balance has been in deficit

Table 2
Gross National Product (GNP) during last quarter — from 1980–2005 In constant Rials—in billion Rials

Year	GNP ^a (without oil)	GNP ^a	Growth ^a %	
			GNP ^a (without oil)	GNP ^a
1980	166,022	219,191	2.6	-7.4
1981	209,919	209,919	1.6	-4.2
1982	178,149	178,149	-2.4	-15.1
1983	170,281	170,281	-5.3	-4.4
1984	191,667	191,667	1.9	12.6
1985	212,786	212,786	12.9	11.1
1986	208,516	208,516	1.4	-2
1987	212,686	212,686	2	2
1988	193,235	193,235	-8.5	-9.1
1989	191,312	191,312	-3.1	-1
1990	180,822	180,822	-7.8	-5.5
1991	160,255	191,503	5.7	5.9
1992	181,171	218,539	13.1	14.1
1993	202,426	245,036	11.7	12.1
1994	212,200	254,823	4.8	4
1995	213,844	258,601	.8	1.5
1996	217,760	259,786	1.8	.5
1997	224,805	267,534	3.2	2.9
1998	240,762	283,807	7.1	6.1
1999	251,005	291,769	4.3	2.8
2000	258,403	300,140	2.9	2.9
2001	265,426	304,941	2.7	1.6
2002	277,274	320,069	4.5	5
2003	292,512	330,565	5.5	3.3
2004	315,945	355,350	8	7.5
2005	334,516	379,009	5.9	6.7

Source: Reports of the Islamic Republic of Iran's Central Bank (<http://www.cbi.ir/simplelist/latestEconomicData-fa.aspx>)

^a In Basis, price (total)

for a long time in Iran, imbalance in foreign trade has increased in recent years. Table 3 shows the import and export figures in the final quarter of the last decade.

Inflationary pressures assailed Iran's economy, especially in 1974 when oil revenues increased fourfold, reaching their highest level in 1977. After the revolution, capital flight, economic embargoes, imposed war, and a huge compression of capital in the service sector, led to price increases. Inflation is mostly the result of high demand. Besides, variables in economic demands, such as accumulation of cash by the private sector, credits assigned to the private sector, components of governmental cost budgets, quantity and method of budget-deficit recovery, and the population growth rate, were not on the right track and have played a destructive role in Iran's economy. Table 4 shows the changes in inflation rates during the last quarter of the past decade.

3. Accounting history in Iran

Accounting in the world has a background of 6000 years and the first accounting documents were discovered 3600 years before Christ's birth. Documents of ancient Iran

Table 3
Exports and imports and exchange rates during 1978–2005

Year	Market exchange rate ^a	Official exchange rate ^a	Total merchandise exports ^{#a}	Total merchandise imports ^{#a}	Surplus (deficit)
1978	79.99	70.62	23,974	18,917	5057
1979	91.1	70.48	16,203	13,872	2331
1980	159.5	70.48	24,970	10,020	14,950
1981	234.25	70.62	12,293	13,441	-1148
1982	395	78.33	10,959	15,515	-4556
1983	475	83.6	22,082	14,345	7737
1984	403.58	86.36	21,507	20,603	904
1985	610.67	90.03	17,087	14,494	2593
1986	639.64	207.3	14,175	13,721	454
1987	815.17	217.5	7171	11,827	-4656
1988	1134.6	221.5	11,916	13,326	-1410
1989	954.17	237.1	10,709	11,696	-987
1990	1431.3	299.1	13,081	13,448	-367
1991	1525.8	394.3	19,305	18,330	975
1992	1535.2	511.7	18,661	25,190	-6529
1993	1624.5	686.2	19,868	23,274	-3406
1994	1968.8	1222.5	18,080	19,287	-1207
1995	2602.2	1750	19,434	12,617	6817
1996	4049.3	1750	18,360	12,774	5586
1997	4445.55	1750	22,391	14,989	7402
1998	4781.5	1752	18,381	14,123	4258
1999	6468.36	1752	13,118	14,286	-1168
2000	8657.68	1752	19,726	13,433	6293
2001	8188	1752	28,461	15,086	13375
2002	8008	1752	23,904	18,129	5775
2003	8019		28,237	22,036	6201
2004	8323		33,991	29,561	4430
2005	8747		44,403	36,639	7764

Source: Reports of Islamic Republic of Iran's Central Bank (<http://www.cbi.ir/simplelist/latestEconomicData-fa.aspx>)

^a Dollars in Rials-# Balances of payments.

show that in 500 B.C. (in Achaemenid era), all public incomes and costs were held and kept, soundly and punctually. In this section, we discuss accounting history in Iran in three different eras: pre-Islamic era, post-Islamic era (from the Abbasid to Qajar era), and contemporary era.

3.1. Accounting in pre-Islamic era in Iran

According to historical documents, Iran has an illustrious history as greatest land and sea trade leaders. As Motazed (1987) points out, Iranians became great traders. From the beginning of Cyrus the Great's rule, trade was deemed a high priority. During the rein of Darius, special attention went into road design and safety, which in turn contributed a great deal to the development and enhancement of trade (Zarrinkub, 1996).

The economy in the Achaemenid era, especially during the rule of Darius the Great, like all aspects and issues of government was well-regulated and organized. The economic

Table 4
Panel A: inflation rates during 1978–2005; Panel B: population and population growth rate in Iran (in thousands)

Panel A: Inflation rates from 1978–2005

Year	Inflation rate (%)
1978	25
1979	9.2
1980	12.3
1989	29
1990	17.4
1994	22.9
1995	35.2
1996	49.4
2000	20.1
2001	12.6
2002	11.4
2003	15.8
2004	15.6
2005	15.2

Panel B: Inflation rate from 1978–2005



Source: Reports of Islamic Republic of Iran's Central Bank (<http://www.cbi.ir/simplelist/latestEconomicData-fa.aspx>)

system was built upon satisfying the needs of people from all strata of life from the poorest to the richest.

The plaques in the ruins of Persepolis⁴ (Takht-e Jamshid) reveal the revolution and solidarity of the social and economic system. These plaques show the economic process with respect to payment, reception of allotment and trade detailed report about the exchanging of goods in different areas. In fact, the plaques chronicle the development of an economy which can be traced from a primitive form, based on barter to a dynamic, sophisticated one, based on coin and money.

We do not claim that the discovered plaques in the ruins of Persepolis explain all aspects of the economic system related to that era, but the significant information extracted from

⁴ Persepolis was an ancient ceremonial capital of the second Iranian era, the Achaemenid Empire, situated some 70 km northeast of the modern city of Shiraz. To the ancient Persians, the city was known as Parsa, meaning *the city of Persians*, Persepolis being the Greek interpretation of the name (Περσες (meaning Persian) + πόλις (meaning city)). In contemporary Iran the site is known as Takht-e Jamshid.

these plaques is the result of the secretaries and counselors' effort in registering the financial reports of those days.

Darius the Great was the originator of the economic and financial affairs recorded on those plaques, including the depiction of tax officers collecting tax. From those plaques we learn about the nomination of tax collectors, the regulation of taxes – how they are received and expended. One person was in charge of dispatching the tax collectors, supervising the entire process, and keeping track of the collected tax. Many people were engaged in this process, including a large number of secretaries and counselors who were responsible for registering all the economic reports and who provided the plaques.

Today we know that the ancients archived documents in two forms – the Rampart plaque and the treasury of Persepolis. Examining these plaques shed light on issues important to the development of the accounting process. From them we learn that the accounting processes and registration of reports were done quite accurately, based on basic accounting principles as we understand them today. The careful figures recorded by the accountants show the exact amount of goods or allotments similar to present-day accounting. We also learn that the early accountants prepared "Balance Sheets". These balance sheets usually covered a few years, and showed the exact date and exact financial figures, that were in use at the end of the year.

The history of tax in ancient Iran is very interesting. Tax collection was customary during the Achaemenid era and the Seleucid era (312 B.C.) which followed. Taxes were collected from great property owners (like Darius), with a lesser share coming from the smaller territories. There was no per capita tax during this period. During the Arsacid era (187 B.C.) the main tax was territorial, received either in cash or goods. A per capita tax was initiated in this era as was the *Custom Toll*.

3.2 *Accounting in the post-Islamic era in Iran – from the Abbasid to Qajar eras*

The study of government's history expresses the evolution of financial and taxation concepts in the Samanid, Safavid and Qajar eras.

During the rein of the Samanids, the government's revenues came for the most part from per capita and territorial taxes. The word "Bureau"⁵ has its roots in this era. Bureau meant bill and was related to the work of the accountant. The Bureau supervised the income and expenditure forecasts. Government experts laid down all the rules pertaining to finance and taxation which were recorded in a book, which was also called Bureau.

During this era, we saw the rise of the "Computation Bureau," which is still used in Iran. In those days, this Bureau was responsible for organizing the income and expenditure i.e., the budget – of the country. Calculation of the courtiers' salary was also done under the supervision of the chief in charge of this Bureau.

During the rein of Seljuks, different accounting methods were invented as required for governance and economic activities. One of these methods was called Siagh accounting, which was used to record public revenues and expenditures and the financial account of businesses. Based on Siagh accounting, all the accounts of each tribe were recorded separately in related pages.

In the Safavid era (Shah Ismail and Shah Abbas), Iran's economy improved greatly. One of the most interesting innovations of the Shah Abbas era is the registration of trade records, which were indeed parents of today's journals. All the traders' transactions, their payables and receivables, were registered in these so-called trade records, which were valuable documents to traders and judges. The fee charged for registration was 5% of each transaction.

During the Qajar era, Iran's revenues came from four major sources: direct tax, property income tax, customs, and lease revenues. The country's indirect revenues came from three sources: confiscation of property, gifts related to Nowruz (the beginning of Iran's calendar year celebrated as national holiday) and the Holy Prophet Mohammad's birthday (March 21), and extraordinary gifts such as bribes, etc. However, the main source of income was property tax, which was paid in cash or other assets. The first Iranian governmental bond was issued in 1892 to replace funds lost when a fine imposed on a Tobacco Company was revoked. At the beginning of the national parliament era, during the rein of Qajar, the governmental budget was prepared and given to parliament for study and approval for the first time in Iran's history. Looking at the early documents, it is evident that the budget experts in parliament were aware of budgetary systems in other countries. When reviewing different sections of this budget, we will point out the following terms: expenditures, public debts, and income forecasting.

Some of the first rules of finance approved in the first and second Iranian national parliament, were the auditing law and its supplementary transportation, tenement and tobacco tax laws; and public accounting laws and the accounting bureau.

Siagh accounting, which was introduced in the Samanid era, was completed during the Ghajar era. "Five Books," which were used for the bookkeeping of main groups of accounts were invented in this era.

Modern bookkeeping and accounting was introduced in Iran in 1900 in the face of emerging industries and their products, and the introduction of foreign companies and institutes. However, progress in this area has been slow due to the sluggish pace of improvements in social and economic conditions (Molkaraee, 2004). Teaching of accounting in Iranian universities started in Dar al-Funun⁶ in 1911.

3.3. Contemporary era — from Pahlavi (1918–1978) until now

Auditing did not spring to life in Iran as a result of changes in the country's economy. Neither the development of limited companies nor the functioning of capital market created the need for auditing. Instead, the idea of auditing first came to light in the Income Tax Law of 1949. The idea of controlling revenues and expenditures was the result of a constitutional Revolution in Iran. The Certified Public Accountants Association was established according to the Direct Tax Law in 1963. The Center of Iranian Official Accountants was established according to the Direct Tax Law in 1966. Moreover, many other laws and regulations have been found which are related to auditing functions and institutions such as the Tehran Stock Exchange Law that requires companies registered on the Tehran Stock

⁶ Dar al-Funun the first modern school in Iran was established by Amir-Kabir (one of the most popular politicians in the Ghajar dynasty).

Exchange (TSE) to be audited. According to the Cooperative Companies Law, auditing is required for Cooperatives too.

The Iranian Expert Accountants Association was registered in 1974. This association is still operating and publishes the *Monthly Journal of Accounting*.

With auditing being required by a number of laws, several of the largest foreign audit firms chose the Iranian Official Accountants as their partners, established branches in Iran, and took the responsibility for auditing large companies. The presence of these firms led to a progressive flow in the accounting profession and education in Iran.

A bill, ratified by the Revolutionary Council after the Islamic revolution in Iran in 1979, confiscated many enterprises or placed them under direct governmental supervision. To audit and perform statutory examination of these enterprises, three audit firms were established in the public sector: Nationalized Industries and Plan Organization Audit Firm (1980), Mostazafan Foundation Audit Firm (1981), Shahed Audit Firm (1983).

In 1983, an act ratified by the Iranian national parliament merged these three audit firms with the Audit Company (established in 1971 to audit government corporations) to establish the Audit Organization. The Audit Organization's by-laws were approved by Parliament in 1987 when the Organization was established as a legal entity with financial independence. It is affiliated with the Ministry of Economic Affairs and Finance and replaces the original audit firms and pursues the activities legislated in the Organization's Act and by-laws.

4. Factors affecting the development of accounting in Iran

Mueller (1968) suggests that the stage of economic development, type of economy, and growth pattern of the economy can affect a country's accounting practices. Douppnik and Salter (1995) argue that the stage of development affects the type of business transactions conducted in a country and the type of economy determines which transactions are more prevalent.

On similar conceptual lines, we can relate the evolution of Iran's accounting practices to five economic issues – financial markets, privatization, tax laws, joining the World Trade Organization (WTO), and legal systems, discussed below.

4.1. Financial markets in Iran

The idea of having a well-organized stock market and accelerating the process of industrialization dates back to the 1930s in Iran when the Melli Bank undertook a study on the subject. A report completed in 1936 worked out the details for the formation of a stock market and laid the foundations for the plan. The outbreak of World War II and subsequent economic and political events delayed the establishment of the stock exchange until 1967, when the Stock Exchange Act was ratified. The Tehran Stock Exchange (TSE) opened in April 1968. Initially only government bonds and certain state-backed certificates were traded on the market. During the 1970s, the demand for capital boosted the demand for stocks. At the same time, institutional changes, like the transfer of shares of public companies and large monopolies to employees and the private sector led to the expansion of stock market activity. The restructuring of the economy which followed the Islamic

Revolution expanded public-sector control over the economy and reduced the need for private capital. At the same time, the interest-bearing bonds were abolished. Because of these events, the TSE experienced a period of standstill.

This stagnation ended in 1989 with the revival of the private sector through the privatization of state-owned enterprises and the promotion of private-sector economic activity based on the *First Five-year Development Plan* of the country. Since then the TSE has expanded continuously.

4.2. Privatization in Iran

Post-revolution, Iran faced two different processes of structural change – nationalization immediately following the 1979 revolution and privatization later in the 1980s.⁷ Financial reporting has gained importance in Iranian companies following international pressures from the World Bank and the International Monetary Fund (IMF) in connection with privatization. Although the working of the stock market is essential to facilitate increased participation of the private-sector in Iran's economic development and growth, the stock market has so far failed to restore the role of the private sector. Akhavi-Pour (1994) explores the reasons for the failure of the stock market in post-revolutionary Iran. He cites information asymmetries resulting from the lack of adequate disclosure by companies as crucial factors. In recent years, privatization of economic entities in Iran has enhanced the need for publicly available financial information. If firms want capital from the public, they need to provide adequate levels of disclosure in their financial reports to inspire investor confidence.

Privatization in Iran started in 1991 based on ratification by the Ministers' Board. This ratification considered the many issues involved with selling shares in governmental companies to the public through the TSE. The results were hampered by some shortcomings, such as a lack of relevant facilities for privatization, the absence of comprehensive privatization laws, the lack of separation of social and economic aims of privatization, and the lack of a suitable system for pricing the sectors, which undermined the accomplishment of full privatization during that period. Table 5 presents the privatization process in Iran from 1991–2002.

4.3. Tax policies in Iran

Since the victory of the Islamic Revolution in 1979, the importance of the taxation system has been the subject of much attention. Nevertheless, an efficient taxation system has not been enforced in the country, which has led to governmental problems and has worsened the imbalance of income distribution in society. The most important taxation law applied in Iran today is the Direct Tax Law which is often used as a reference most of the time.

The current tax laws present a challenge for accounting standard setters. For example, they impede the acceptance of fair values. And, since the tax laws are used as the main effective measure of depreciation methods in financial reporting, it would be hard to replace them.

⁷ Nationalization is the transfer of ownership and management of large-scale established industries or services to the state. Privatization is the transfer of a function and activity from the public to the private sector (Akhavi-Pour, 1994).

Table 5

The privatization process in Iran from 1991–2002

Year	The privatization amount in public firms	
	Current costs	Historical costs
1991	266	1435
1992	229	857
1993	288	840
1994	924	1996
1995	516	746
1996	1091	1280
1997	173	173
1998	726	645
1999	2348	1654
2000	1722	1078
2001	201	113
2002	3131	1520

Source: Reports of the Islamic Republic of Iran's Central Bank (<http://www.cbi.ir/simplelist/latestEconomicData-fa.aspx>)

4.4. Membership in the World Trade Organization (WTO)

Joining the WTO would be a gradual, multi-step, and long process with considerable impact on the trading environments of member countries. When about 97% of world trade is conducted by such an organization, with its own rules and regulations, it should not be ignored. It is a mistake to believe, as some in Iran do, that joining the WTO would not affect the accounting and finance fields. Since accounting is the language of trade, it should gradually adopt international standards. The mentioned fields are not separate from trade and economics; there is, rather, a natural relationship between them. It is not possible to compile and execute accounting standards and financial reports without considering the environmental factors. On the other hand, financial reports affect the economic and financial decisions. In fact, the decisions presented in financial reports are affected by the economic and job environment. It is expected that the increase in competition, removal of trade barriers, and satisfying other conditions of joining the WTO would lead to the development of Iranian financial markets and accounting standards. According to Wolk and Heaston (1992) there is a need for harmonization of international accounting standards among nations because of:

1. The increasing globalization of business operations (e.g., the growth of a global market economy including the rise of multinational firms),
2. The need to communicate financial accounting information to an international audience by increasing improvements in information technology, and
3. A higher degree of comparability among financial reporting on an international basis.

4.5. Foreign investment in Iran

An increase in foreign investment results in the development of financial reporting in accounting because investors and foreign lenders are interested in financial reporting

related to the trade companies. Observing international accounting standards, makes the reporting more useful to investors. To attract direct foreign investment in oil and (especially) non-oil products, therefore, financial reporting should follow accepted accounting standards. Table 6 presents foreign investment in Iran from 1993 to 2002. This table shows that foreign investment in Iran is low. One of the ways to attract foreign investment is to improve accounting standards and financial reporting.

For Iran's efforts to enter world trade by joining the WTO, to be successful, and to encourage privatization, growth of the private foreign sector, and audit and accounting standard setting in Iran must be greatly improved. In the part, auditing and accounting standard setting in Iran was more based on legal laws and regulations, but the above mentioned factors affect the academic and professional development of accounting too.

4.6. Legal system in Iran

International accounting literature has long recognized that the prevalence of a particular legal system (common-law or code-law) in a country affects the accounting system followed (Berry, 1987; Fantl, 1971; Nobes, 1983). The literature recognizes that common-law countries are inclined towards fair presentation, transparency, and full disclosure (known as the Anglo-Saxon model). Standard setting is carried out in these countries by bodies in the private sector, and the stock market is the dominant source of financing for corporate entities. In code-law countries, banks or governments are the main sources of financing and financial accounting is geared towards creditor protection (known as the continental model). Financial reporting, in these countries, is characterized by low disclosures and an alignment of financial accounting with the tax laws. In addition, governments exert a strong influence on setting accounting standards. Recently, researchers have shown a renewed interest in empirically examining the relationship between accounting systems and legal systems in various countries. La Porta, et al. (La Porta, Lopez-de-Salines, Shleifer, & Vishny, 1997, 1998, 2000), suggest that the type of legal system a country has predisposes it towards a particular system of finance. That is, a common-law legal framework emphasizes shareholders' rights and offers a stronger investor protection system as compared to that of a code-law legal system. This linkage leads to the development of strong

Table 6
Foreign investment in Iran from 1993–2002 (In billion Dollars)

Year	Foreign investment	Growth rate
1993	20.3	
1994	187/8	825
1995	251/2	34
1996	132/3	–47
1997	203/9	54
1998	72/9	–64
1999	1047/1	168
2000	491/1	–53/1
2001	620/9	26/4
2002	52/1	–91.6

Source: Reports of Islamic Republic of Iran's Central Bank (<http://www.cbi.ir/simplelist/latestEconomicData-fa.aspx>)

equity markets in common-law countries and weak ones in code-law countries. Consequently, in code-law countries, debt rather than equity is the dominant source of financing.

Iran exhibits many of the characteristics of a code-law country. It has a weak equity market, a strong preference for and use of debt as a source of financing (as against use of outsiders' equity), and a general perception of low-quality financial reporting. Thus, it can be argued that Iran should be considered a code-law country. This implies that the lack of investor protection (e.g., minority-rights protection, insider-trading protection), judicial inefficiencies, and weak enforcement mechanisms are more likely to explain the state of financial reporting in Iran than are cultural factors. This insight has policy implications for developing countries that are working hard to improve the quality of financial reporting for their business entities.

4.6.1. Corporate governance in Iran

Although the stock exchange was established in early 1961, and the process of instituting and controlling companies was mentioned in the Trade Law, particularly in the amendment of April 1968, a modern conception of the corporate governance issue was addressed in early 2000 for the first time. At that time, the managers of the Tehran Stock Exchange (TSE), Islamic parliament Research Center, and a specialized committee of the Economic and Finance Ministry began to conduct surveys on corporate governance in Iran. These surveys find that the characteristics of corporate governance in Iran approximates internal governance structures — systems where all the listed companies in country are owned and controlled by a few, major shareholders. These shareholders are often divided into different groups: the foundation group, the creditor banks (which are a small group), other companies or the government. However, recent efforts to expand the capital market show that Iran is interested in changing this system to external governance structures. For instance, in the third and the fourth Economic Development plan, privatization of governmental organizations is given a great deal of importance and is seen as an instrument for changing to external control system. In fact, observation of companies and the stock market in Iran shows that there are already some external control mechanisms in place, e.g., required legal supervision according to the Trade Law (especially clauses 144–156), stock exchange laws, the Audit Organization statute, and the Iranian Official Accounting society rules.

The capital market in Iran is very new and somewhat inefficient. Pension funds, mutual funds, and insurance companies now own more than half of the publicly held stock on the Tehran Stock Exchange (TSE). The major shareholder's supervision depends on certain activities such as buying controlling stock and the role of institutional investors. Minor shareholders have no supervisory role. However, auditing the financial statements of companies on the stock exchange is mandatory. But, there is no rating institutions in Iran or any system for proper supervision of internal control mechanisms. Despite recent concerns in the field about boards of directors' and other issues related to executive management, such as dividing the responsibilities between executives and managers, the role of non-executive managers is very weak in Iran and there is seemingly no concern about supervising organizational morality.

Fortunately, in late 2004, the TSE Research and Development Center published the first edition of the Code of Corporate Governance in Iran. The 22 clauses contain some

necessary definitions, management, board, and shareholder responsibilities, financial disclosures, accountability, and auditing concepts. This code was edited in 2005 based on the ownership structure, the capital market situation, and the Trade Law. The second edition of Code of Corporate Governance in Iran has 5 chapters and 37 clauses. This code was announced via media and implemented by many companies. Appendix A, provides a summary of the second edition of Code of Corporate Governance in Iran.

5. Codification of accounting standards in Iran

5.1. History of accounting standards in Iran

Prior to 1979, financial reporting in Iran was influenced heavily by Anglo-American practices (Mirshekari and Saudagaran, 2005). There were no national accounting standards and disclosure requirements were based on tax law, corporate law, and stock exchange regulations. The tax law requires firms to prepare a balance sheet, income statement, and a list of shareholders (with their holdings).

The tax law prescribes a set format for reporting tax-deductible expenses, computing depreciation, and accounting policies related to certain expenses. The main disclosure requirements of the corporate law were contained in Section X of the 1969 Amendment to the Commercial Code with Articles 232–242 specifying the rules for preparing financial statements, disclosing any changes in accounting methods, contingent expenditure, and the required methods of depreciation. In 1970, the tax law decreed that the Iranian Official Accountants Institute and the Official Accountants were in charge of verifying the tax liability reported in financial statements.

From 1966 to 1978, there were requirements to have corporate financial statements audited. For example, the regulations of the Tehran Stock Exchange required that publicly traded companies have their financial statements audited by the Official Accountants. Therefore, all the Big Eight international accounting firms in Iran had Official Accountants as their employees. In the 1960s and 1970s, then the Big Eight dominated the public accounting profession in Iran. While there was an emerging cadre of local and Western-trained Iranian accountants, the Big Eight tended to be dominated by expatriates from the United Kingdom, the United States, and South Africa. This contributed to accounting and auditing in Iran being influenced by foreign practices. However, these developments were ad hoc and there was no systematic structure in place either for setting national accounting standards or for adopting international accounting standards.

Following the Iranian revolution, in 1980, an amendment to the Direct Tax Law disbanded the Official Accountants Institute. The public sector's control and ownership of previously private enterprises made necessary the establishment of audit enterprises for managing business entities expropriated by the government. Therefore, during 1980–1982, the government established audit enterprises and the Budget, Planning and National Industries Organization. These new organizations recruited a large number of accountants who were previously employed with private auditing firms. In 1987, following the merger of the public-sector audit entities, the Audit Organization was established as the sole auditor of organizations with public ownership and as the only regulatory body for national accounting and auditing standards. The Audit Organization is responsible for compiling

and determining principles and rules of auditing and accounting in Iran. The Audit Organization's main objectives are:

- To provide the government with basic needs in the field of auditing and specialized financial services for state owned and government supervised entities;
- To set Accounting and Auditing Standards and Professional Ethics in compliance with Islamic Rules as well; and
- To research in scientific and practical methods of accounting to enhance accountancy compatible with the country's needs.

The Audit Organization has operated well in compiling accounting standards. In 1992, the Committee of Compiling the Accounting Declarations was assigned to codify necessity guidance to provide consistency and remove the current incompatibility, based on valid standards and environmental conditions. Considering the importance of the assignment, the committee decided to take an opinion poll about accounting standards. Drafts of nine accounting declarations and the framework for preparation and publication of financial statements were supplied. Next, five other declaration drafts were sent to public and other drafts were sent to some special groups in 1996. Using the relevant public and professional suggestions, the committee published the first set of accounting declarations in 1999.

Education programs held to introduce and execute the accounting declarations in the field have met with great success. The name of that committee was changed to the Accounting Standards Setting Committee. In response to feedback from the educational programs, changes in international standards, and experts' opinions about managing the compilation of accounting standards, the committee compiled the draft of the first collection of accounting standards and presented it to the Technical Committee. After examination and revision by the Technical Committee, these standards were passed onto the board of the Audit Organization for final approval at the Audit Organization's public convention.

Accounting standards 1 through 22 were issued after approval by the Audit Organization's public convention, and applying them has been mandatory since 2001.

Next, the Accounting Standards Setting Committee added three other standards to its work (joint ventures, pre-operation entity's reporting, and segment reporting). After finalization, the committee assigned them to the Technical Committee. These standards were studied by the Technical Committee and sent to the board. On the basis of the Audit Organization's public convention approval, these new standards became mandatory in 2002.

Based on Article 4 of the Third Economic, Social and Cultural Development Plan, the Audit Organization's by-laws were revised and approved by the Council of Ministers in 2003 and the Organization's legal status changed to the State Owned Limited Company.

The Audit Organization is responsible for:

- Audit and statutory examination
- Financial and management consultancy services
- Setting accounting and auditing standards
- Training, research, and publications

5.2. Accounting standards due process in Iran

During the past two decades, the Audit Organization has taken various measures to enhance the profession of accounting in Iran. In order to harmonize accounting practices in Iran with global standards the Audit Organization has studied translations of International Accounting Standards (IAS), prepared and published a number of textbooks on the accounting and auditing standards of developed countries, and published specialized sets of accounting and auditing manuals, which has led to the issuing of accounting and auditing guidelines at a higher level. The Audit Organization has also prepared and issued the accounting and auditing standards and the code of ethics.

Accounting standards' due process includes different steps in Iran, as in other countries. that provide standards at the present time, the Audit Organization is the official and legal venue responsible for standard setting in Iran. The Organization recognizes the needs and points of view of users. Some needs are identified by communication with the scientific and industrial communities and some reflect the organization's responsibilities to external auditing by considering financial reporting problems and defects and discussing them with the management of related entities. Iran, like many countries, has accepted international standards for more convergence. Therefore, in most cases, standard setting follows the publication of new international standards.

The due process of accounting standards development may be summarized as follows:

1. Deciding on a subject for research. The Accounting Standard Setting Committee decides on the topics to be considered by the Standard Setting Department.
2. Preliminary studies. After deciding on the subject, necessary research and studies are carried out by the advisors of the Standard Setting Department. In this phase, the accounting standards used internationally in countries such as the USA, the UK, Australia, and Canada are examined in relation to the subject, and compared to accounting practices in Iran. The law and all issues relating to the subject are recognized, collected, and studied. The conclusion of this phase is the presentation of study reports.
3. Deciding on the necessity of a standard development. The Standard Setting Committee decides on the necessity of developing standards based on the result of preliminary studies.
4. Preparation of a primary draft. If the Accounting Standards Setting Committee requires the development of a standard, the advisory group prepares a primary draft based on study reports, after field studies and some meetings with professionals and constituents. One of the main policies influencing accounting standards development is compliance with International Accounting Standards. Therefore, if there is an International Accounting Standard for the subject, it is used as the main source for the Iranian standard development. The outcome of this phase is the primary standard draft.
5. Development of the standard draft. In this phase, the Accounting Standards Setting Committee presents the final standard draft, after as in depth and broad reviews and making the necessary amendments. The outcome of this phase is a draft for the standard under development.
6. Public comment. Every standard draft is made available to the public for comments in different ways, including publishing them in professional journals, posting them on the

Internet (the Audit Organization Site), etc. In addition, depending on the subject, the standard draft is sent directly to some professional authorities. The public comments are sifted and presented to the Accounting Standards Setting Committee by the Standards Setting Department. Based on this information, the Committee will make any necessary amendments to the draft, which is then submitted to the Technical Committee for approval. The revised standard draft is presented to the Board of Executives of the Organization.

7. Ultimate approval. The Board of Executives reviews the Accounting Standards, along with any amendments, and sends them to the Board of Governors of the Organization for ultimate approval. After approval by the Board of Governors, the final text of the accounting standard is published and its observance becomes mandatory. Table 7 shows accounting standard due process in Iran.

Table 7

Accounting standards due process

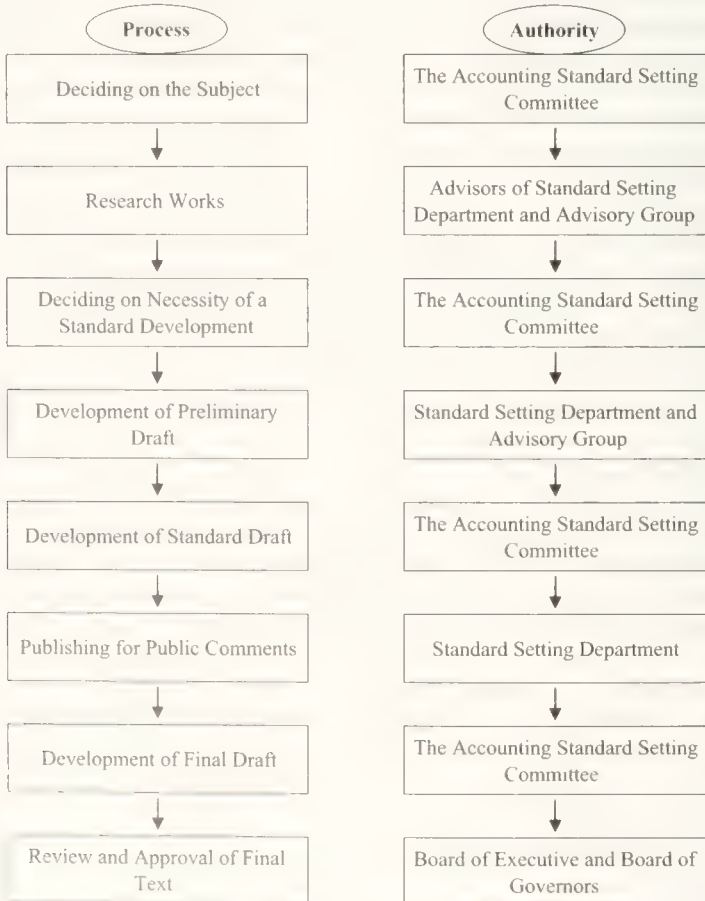


Table 8 shows the list of Iranian National Accounting Standards (NASs) and similar International Accounting Standards (IASs). Twenty-seven accounting standards have already been issued and two more accounting standards are in process by the Audit Organization. In addition, other tasks are in process in order to adjust the present standards and new ones.

The influence of culture on national accounting systems has been a feature of international accounting literature for several decades – the work of Gray (1988) and Hofstede's (1980) social value dimensions. A critical facet of these enquiries is the notion that cultural values influence accounting values and hence accounting practice (Foroughi, 1981; Hussein, 1996; Jaggi and Low, 2000). Belkaoui (1991) argues that accounting is in fact determined by culture which accounts for the lack of consensus across different countries as to what represents proper accounting methods. Poorjalali and Meek (1995) study change in Iran's culture before and after the Islamic revolution and the impact on accounting values. The results conform to Gray's theory and confirm the impact of culture on accounting values in Iran. However, Rezazadeh (2002), in recent research, obtains different results. His results show that while masculinity is increasing in Iran, the tendency to conceal is decreasing. Noravesh and Dianati (2003) find that Gray's opinion has little explanatory ability in Iran.

Table 8
Iranian National Accounting Standards (NASs) and similar International Accounting Standards (IASs)

NASs Num	Subject	IASs Num
1	Presentation of financial statements	1
2	Cash flow statements	7
3	Revenue recognition	18
4	Accounting for contingencies (<i>is deleted now</i>)	10
5	Accounting for events after the balance sheet date	10
6	Reporting financial performance	8
7	Accounting for research & development costs	38
8	Accounting for inventories	2
9	Accounting for long-term contracts	11
10	Accounting for government grants	20
11	Accounting for tangible fixed assets	16
12	Related party disclosures	24
13	Accounting for borrowing costs	23
14	Presentation of current assets & current liabilities	1
15	Accounting for investments	32,39
16	Foreign currency translation	21
17	Accounting for intangible assets	38
18	Consolidated financial statement and investment in subordinate	27
19	Business combinations	22
20	Accounting for investments in associates	28
21	Accounting for leases	17
22	Interim financial reporting	34
23	Accounting for joint ventures	31
24	Financial reporting by development stage entities	N/A
25	Segment reporting	14
26	Agriculture	41
27	Retirement benefit plans	26

6. Conclusion

The primary purpose of this paper is to explore the origin, growth and development of accounting in Iran and the factors that have influenced them. We trace the early days of accounting in ancient Iran using documents from 550 B.C. (in the Achaemenid era), that show that all public income and costs were held and kept properly and punctually. Then we discuss accounting history in Iran in three different eras: pre-Islamic era, post-Islamic era (from the Abbasid to Qajar era), and the contemporary era. For an emerging economy like Iran, we argue that six important issues – financial markets, privatization, tax laws, joining the World Trade Organization (WTO), foreign investments, and the legal system are important keys to improving the quality of financial reporting. Prior to 1979, financial reporting in Iran was influenced heavily by Anglo-American practices (Mirshekari and Saudagaran, 2005). There were no national accounting standards and disclosure requirements were based on tax law, corporate law, and stock exchange regulations. However, during the last two decades, Iran's Audit Organization has taken various measures to harmonize the Iranian Accounting profession with global practices.

We also argue that Iran exhibits all the accounting hallmarks of a code-law country. Those include lack of investor protection (e.g., minority-rights protection, insider-trading protection), legal inefficiencies, and weak enforcement mechanisms and are critical to understand the state of financial reporting in Iran. This insight has policy implications for developing countries that are working hard to improve the quality of financial reporting of their business entities.

In summary, special features of the operating environment, existing laws and rules, religious beliefs, culture, and economic and political conditions have been considered in the National Accounting Standards setting processes in Iran, as they are in other countries.

Appendix A. The Iranian Code of Corporate Governance (ICCG) — summary

**Chapter 1 (descriptions) — clause 1*

This chapter contains the descriptions and expressions used in this instruction manual, including independent manager, non-executive manager, minor shareholder, controlling, considerable dominance, stock trustee, stock services, major shareholder, important/large companies, secret information holders or insiders, main/mother corporations, subsidiary corporations, affiliated corporations, dependent individual, subordinates, and main managers.

**Chapter 2 (board of directors) — clause 2–20*

In this chapter, characteristics of the board of directors' such as selection method, number, structure, and duties, are described. The most important issues in this part of the instruction manual are:

1. The board of directors' qualifications and effectiveness.
2. The clear separation of responsibilities between board of directors and administrative managers.

3. The independence of the CEO from the board chair.
4. The number and composition of the board of directors.
5. The need for the majority of board members to be non-executive.
6. The necessity of meetings at least once a month.
7. The necessity of forming an auditing committee and delivering its responsibilities.
8. The necessity of having an effective internal control system for the safekeeping of properties, appropriate reporting, and observing the rules, and the need for the annual evaluation of that system.

**Chapter 3 (public-assembly) — clauses 21–30*

In this chapter, the shareholders public society's characteristics and responsibilities are discussed. Some of the important issues in this chapter are:

1. The selection method of management boards for public shareholders.
2. The determination of compensation for each member of the board of directors.
3. The need for reports given by the board of directors, legal warden, and independent auditors to be made at least 10 days before the public-assembly meeting.
4. The need for financial statements to receive a public declaration of approval within 10 days of the public-assembly meeting.
5. The need for a majority of the board of directors, independent auditors, legal warden, and the representative of the stock exchange to attend the public-assembly meeting.

**Chapter 4 (accountability and disclosure) — clauses 31–36*

In this chapter, mandatory disclosures are discussed, including annual financial statements, six-month financial statements, information about stock transactions related to the board of directors and top executive managers and their families, information related to insiders, general information related to the organizational structure, products, human resources, social responsibilities, and company environment, and information related to corporate governance such as audit committees, the board of directors' characteristics, and the dividends paid by company.

**Chapter 5 (frauds and penalties) — clauses 37–38*

In this chapter, the managers' and companies' frauds and penalties are discussed.

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Book Review Section

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Book reviews

Global Dimensions of Corporate Governance, Yadong Luo, Paperback Edition, Blackwell Publishing, Malden, MA, USA (2007), (Oxford, UK, Carlton, Australia, xvi+ 276 pages, £25.99, € 34.50, US \$44.95), ISBN-13: 978-1-4051-3707-2

This book is one of the six volumes of *Blackwell Global Dimensions of Business Series*, designed to provide comprehensive material on international business and management, which is ideal for graduate students, executives, consultants, and academics. This particular book aims to provide an in-depth analysis of corporate governance from a global perspective, as well as discussions on why corporate-governance systems should be different for Multi-National Companies (MNCs). Overall, the author succeeds in putting forward a convincing proposition as to why MNCs must consider corporate-governance systems from a different perspective, and provides a wealth of resources for the targeted audience.

The notion of corporate governance and the importance of *good* corporate-governance systems are not new. Rather, the interest in the way today's global corporations are governed has increased dramatically in the last decade, notably due to two major global business-related events, one in developing economies (the 1997 Asian financial crisis) and the other, in the United States (the collapse of high-profile corporations such as Enron and WorldCom). Both practitioners and academics subsequently have considered various aspects of corporate governance and how they may be associated with, among others, corporate performance, earnings management, and fraudulent-financial reporting activities (e.g., Anderson, Mansi, & Reeb, 2004; Klein, 2002; Sharma, 2004). There also has been an influx of book publications regarding corporate governance, with a new book seemingly being published every other week. The level and scope of interest has not been restricted to one particular economy either, nor have the aspects of corporate governance, starting with the very basic mechanisms of corporate governance such as the board of directors and their independence, to more conceptual discussions based on agency, stakeholder and legitimacy theories, and how these can be applied to governance mechanisms.

One of the major strengths of this book is that the author incorporates the current business environment into the discussions of corporate-governance practices in different geographical regions with varying cultural and economic backgrounds, and explains how these differences can affect even the very basic governance mechanisms. These concepts are well supported by a series of real-life case examples at the end of each chapter, linking the theory and practice in a user-friendly manner. These cases deal with well-known global corporations and their governance systems, which should be relevant and familiar to readers, tying neatly to the book's objective of looking at the global dimensions of corporate-governance practices, and thereby reinforcing the author's arguments in each chapter. While there are no discussion

questions at the end of each case, this absence may not be an oversight given the advanced level of the intended audience and the self-explanatory nature of each case.

The author also provides a comprehensive list of references and further readings at the end of each chapter. Along with the case studies, they are valuable resources for readers, especially for research students and academics. This is a must-read book for those wanting a comprehensive understanding about corporate governance, especially in relation to MNCs and global economies. The book has seven chapters, and is structured as follows:

Chapter 1 introduces the concept of corporate governance and how governance mechanisms might differ between MNCs and domestic corporations. The author classifies governance mechanisms into three categories: governance based on (1) market; (2) culture; and, (3) discipline. There is one problem with this classification; the second category, *Governance Based on Culture*, seems to refer only to corporate culture, not national culture. Given that the emphasis of this book is on global dimensions of business, one would expect to read about how differences in national culture may influence governance practices of MNCs in this section. While there is no denying that corporate culture can influence and be influenced by governance mechanisms, a commentary on national culture associated with MNCs, as defined initially by Hofstede (1980), would have completed the discussion regarding culture and governance.

Using the concepts introduced in the previous chapter, chapter 2 explains some of the reasons behind why corporate-governance practices may differ in different countries. In comparing governance practices of different countries, the author classifies countries from the Anglo-Saxon system into one group, with continental Europe, Asia, and transition economies being the other groups. While this theoretical framework intrinsically makes sense, it would have been interesting to see some empirical evidence as to whether the governance practices actually *do* differ according to this classification. That is, given the differences between these groups in terms of their cultural philosophy, institutional differences, legal systems, and political ideology, is there any evidence that MNCs from each group would adopt different corporate-governance mechanisms? The author's arguments might have been further strengthened if a summary table comprising groups of countries and their similarities/differences was included in the chapter.

Chapter 3 considers whether corporate-governance mechanisms would be influenced by global activities undertaken by MNCs. The author puts forward a series of propositions about how firm-level characteristics, such as geographical dispersion, sales, and other related global attributes, would influence the level of corporate-governance practices. The propositions outlined in Fig. 3.1 (p.85) are well argued by the author using an array of theories, and are ideal for academics as research questions to be empirically tested. They might have been more impressive if, as a way of linking chapters 2 and 3 together, the propositions regarding country-specific attributes (discussed in chapter 2) and their influence on MNCs' governance practices were included as well.

In chapter 4, the author examines what is perhaps the most unique aspect of MNCs compared to domestic corporations – the global relationship between the parent company and its subsidiaries, and how the relationship can impact on corporate-governance mechanisms. Typically, MNCs would have a parent company from developed economies. Subsidiary MNCs would then venture into different markets to operate and, subsequently, would need to deal with individual domestic markets and their idiosyncrasies. One potential

improvement which can be made to this chapter in future editions is regarding the format and volume of contents in the final section of the chapter, *4.3 Managerial Governance in Global Business*. Despite the author stating that “...managerial governance is not the focus of this book...” (p.114), this section is 10 pages long: due to the sheer volume of information without sub-sections or headings, it is difficult to read and maintain interest.

Chapter 5 introduces a new concept of corporate accountability in MNCs in conjunction with corporate-governance mechanisms. The author points out why it is more difficult to define, implement, and regulate accountability for MNCs and argues that there is more emphasis on transparency regarding government policies and financial reporting (both voluntary and mandatory) for MNCs than for domestic corporations. The author provides an excellent review of how accountability supports corporate governance and how corporate governance, in turn, promotes effective accountability. It is also a fitting prelude to the following chapter, which considers one of the most important determinants of transparency – the level of corruption.

Chapter 6 examines one aspect of the external environment linked to transparency in government policies that cannot be avoided by MNCs, especially for those operating in developing or transitional economies. The author presents well-argued reasons as to why anti-corruption is important to corporate governance, and explains how different cultures, both at the national and corporate levels, can affect what is considered corrupt behavior. That is, corrupt behavior in one culture may be considered as the norm in another. The chapter ends with suggestions regarding the ways in which MNCs can combat negative consequences stemming from corruption, providing invaluable references to readers, especially for executives and consultants.

The author uses the last chapter to summarize all the concepts and ideas put forward in previous chapters. The notion of corporate social responsibility (CSR) is introduced as a way of giving further credence to the importance of good corporate governance. CSR is an important part of corporate governance since it can identify different stakeholders of MNCs, and their needs must be met in order to govern MNCs effectively and efficiently. The author argues that MNCs bear greater CSR than their domestic counterparts, since the majority of MNCs are scrutinized to see whether they cause and/or alleviate social problems in the emerging economies they may operate in. The chapter ends with an informative section on what should be done to improve the CSR of the MNCs operating in developing economies. Once again, however, an inclusion of a table comprising current CSR practices of MNCs originating in various countries would have been helpful in recapitulating the argument.

In summary, I believe that the book achieves what the author has set out to do; “...to be a pioneering initiative to delineate corporate-governance systems in international business” (p. xi). The book provides detailed and up-to-date theoretical background information to the current global corporate-governance environment, and considers firm-specific and country-specific variables which may influence corporate-governance practices of MNCs. The book is indeed ideal for readers from different spectrums and interests. Graduate students in particular, would find the composition of each chapter very useful; each of the seven chapters contains an executive summary and list of references for future readings, as well as up-to-date and relevant case studies for further discussions. Further, many of the concepts and discussions are based on well grounded theories, and the list of propositions regarding dimensions of corporate governance would also be very useful to research students and academics.

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Comments by Paul Rosenfield on a Review by Professor George J. Benston in *The International Journal of Accounting* (42 [2007] 216–219) of Rosenfield's book *Contemporary issues in financial reporting: A user-oriented approach*

1. Overall comments

I suspect that a different kind of review would have been produced by someone with fundamental positions on financial reporting that differ from those of the reviewer.

I can make the following comments:

- The review states that I define “current selling price reporting (CSPR)” as reporting “assets and liabilities...continuously at their [current] selling...prices.” However, I define CSPR in the first sentence of Chapter 14 to refer only to assets, not to liabilities.
- The review states that I do not “discuss the FASB’s current move towards restating assets...at their fair values.” I do discuss that, in the section on “Creeping In” at the end of Chapter 14.
- The review states that I do not show how to present one set of financial statements with the numbers defined in terms of the consumer general purchasing power of the unit of money. I do refer on page 263 to illustrations of how to do it, in AICPA, “General Price-Level Changes,” and SFAS No. 89.
- The review states that I don’t mention work in progress in connection with CSPR. I do refer to work in progress in that connection, on page 323.
- The review states that I haven’t considered “the extent to which financial statements prepared with exit values would be of value to investors.” I have considered that, in the section “CSPR and the User-Oriented Criteria” in Chapter 14.

The review states that my use of quotations comprises a “substantial portion of the book,” as if that were a bad thing. It gives no recognition to my reasons for including the quotations, among which were as follows:

- This is a textbook on many of the most important issues in financial reporting. I considered it important to inform the students of the variety of opinions on the issues, not merely by referring to them, but also by quoting typical passages in the literature stating those opinions. I did this in place of including whole articles as many such books do (except that I included one whole (short) article).
- The quotations are well stated and I believed they give the students insight into the positions on the issues in addition to the way I state them.
- The review complains that I don't include supporting reasoning, example, or study with the quotations. First, many of the quotations include such support. Moreover, I provide the needed reasoning, examples, and studies in the material I provide introducing the quotations.
- The review states that "since many assets...have no ready markets, accountants would have to estimate the [current selling] prices" and that "exit values might be estimated with appraisals that could not readily be validated." It does not refer to my discussion of evidence for the measurement and auditing of current selling prices on pages 311 to 314, in which I discuss the difficulties that implementation of CSPP can cause and give guidance for dealing with the difficulties.

The review reflects the view that I have failed to make my arguments stand on their own, apart from the quotations: "it was difficult for me, at least, to discern just what Rosenfield, himself, is critical of and, of greater importance, his reasoning and evidence for that criticism." I challenge the reviewer to specify even one of my conclusions that is not stated clearly and is not supported fully by the reasoning and evidence I present apart from the quotations.

2. Specific comments

The review ignores the real reasons I present for my position that the amounts in current financial statements cannot be successfully audited, which are that

- The majority of the amounts in current financial statements result from systematic and rational allocation and from thoughts of the issuers of the statements about future events.
- The results of systematic and rational allocation do not purport to represent anything outside themselves and thereby involve nothing that can be observed and verified by independent observers.
- The thoughts of others cannot be audited; as Kam says, "we cannot be expected to read people's minds."

The review states that it "found it quite difficult...to determine the specifics of [my] complaints." I believe they are stated specifically, even forthrightly (see page 6 in the book), throughout. Because of space limitations, here are only a few examples of many such conclusions:

- *Pages 8 to 10:* The 37 ideas listed on those pages, which in effect summarize many of my complaints in a specific manner.

- *Page 33*: “three ways in which financial reporting didn’t evolve completely in fundamental areas: (1) from accountability reporting to reporting for accountability and economic decisions, (2) from venture reporting to time period reporting, and (3) to the concept of the reporting entity as the sole focus of attention.”
- *Page 261*: “Defining the unit of measure in terms of the debt-paying power rather than the consumer general purchasing power of the dollar forces presentation of amounts [that] violate the...criterion that the financial statements be understandable to the users.”
- *Page 304*: “Current selling price is the only attribute of an asset measurable in terms of consumer general purchasing power at [the current] date in the world outside of... thinking [about the future] and outside of...preparation of a presentation of [the] current situation in terms of consumer general purchasing power.”
- *Page 366*: “A new section of the income statement on investments in prospects, indicating amounts charged to expense spent to enhance prospects...could help the users.”

“Entrance values” are “clearly” *not* “more meaningful to stockholders of going concerns than exit values,” because entrance values, defined as the prices at which the reporting entity can currently buy assets it owns, don’t exist, or, as the prices reporting entities would have to pay to buy assets it doesn’t own, are not part of the financial position or history of the reporting entity. The latter are part of the buying opportunities of the reporting entity, about which financial statements should not report, but, if necessary, disclose.

I think that Robert Herz and David Tweedie, the chairmen of the FASB and the IASB, would not agree that my views “reflect, to a substantial degree, the thinking of FASB and IASB policy makers.”

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Response by George J. Benston to comments by Paul Rosenfield on a review of *Contemporary issues in financial reporting: A user-oriented approach* published in the *International Journal of Accounting* (42 [2007] 216–219)

As an author of a recently published book, I am painfully aware of the effort and thought necessary to organize and present a substantial manuscript. Paul Rosenfield clearly expended this effort. To the extent that I have not been fair or accurate in reviewing his work, he has the right to object and I commend the Editor for giving him this opportunity. It also provides readers of the *IJA* with a continuing debate on perhaps the most important issue facing accounting—how should the reported numbers be stated: at their historical cost, replacement (entrance) cost, or net disposal (exit) value?

Rosenfield first lists five errors in my review. (1) He correctly points out that I wrote that he defines his suggested current selling price reporting (CSPR), exit-value measure as applying to liabilities as well as assets. I should have stated that his application of CSPR is inconsistent, as he applies it only to assets. (2) His "discussion" of the FASB's current move to fair-accounting consists of a list of applications. I had hoped for an analysis and critique. (3) He does *refer* to a paper showing how price-level adjustments might be made. (4) He mentions inventories within a discussion of specialized assets, both of which he would write down to scrap value, since the revenue they might generate is a gamble that might not pay off. (5) He does, indeed, assert that CSPR-based financial statements would be relevant to users, because the numbers reported would show the extent to which the firm is "increasing its current possession of or access to consumer general purchasing power. (This is the central argument in this book in favor of CSPR) [p. 308]." CSPR is relevant if shareholders and creditors wanted to know what they might get if the firm were liquidated and the assets and liabilities could be sold and discharged at the amounts specified in the balance sheet. I submit (again) that this information is of limited value to investors.

Rosenfield next objects to my implied criticism of his extensive use of short quotations. If readers find this a useful way to learn about the opinions and observations of a large number of authorities, they will appreciate his considerable effort to put these together in one book. I did not find it helpful to get opinions and arguments in the form of assertions and observations in the form of "sound bites."

Rosenfield's next "bullet point" relates to a very important issue — how the selling prices of assets might be determined. In the three and a bit pages where he discusses this issue, he presents eleven quotations. These writers and Rosenfield observe that both exit and entrance prices are "fictions" — amounts that *could be* received or paid. He then concludes: "If no reliable evidence is available ... the resource should be disclosed but not reported as an asset." I now understand why he doesn't mention auditing problems, because assets with no ready markets would be recorded at zero. Furthermore (as he states next), there would be no allocations of costs over future period. The resulting statements, I submit, would receive high marks for reliability, but low marks for relevance.

Among his "specific comments" Rosenfield says that I should have found his opinions easy to discern, citing page 6, where he writes: "I have forthrightly stated my own views" That paragraph is dominated by two quotes that give *other* people's views. The next pages cited (8–10) do indeed present a list of 37 "ideas." Scattered throughout are many statements that are more accurately described as aphorisms (e.g., financial statements should ... not incorporate false assumptions, not affirm and deny the same thing, and obey the rules of arithmetic; financial reporters shouldn't play tricks on the users, the map isn't the territory, and issues that have long evaded solution in financial reporting should be solved or reformulated). In the body of the book his conclusions do appear, as he says. I found them difficult to dig out from the heaps of quotations.

Rosenfield summarizes his objection to entrance values in a way that illustrates my basic conceptual concerns with his book. He dismisses present values because they are very unreliable, an objection that I share. Entrance values, he points out, "don't exist ... [because] they are not part of the financial position or history of the reporting entity." The same objection, though, applies to exit values, since the enterprise's assets were not sold. Only historical costs can meet this attribute of numbers that should be presented in financial

statements. The key attributes, though, I submit, are “trustworthiness” and “relevance to investors in going concerns,” with the caveat that numbers that are not trustworthy are not, as a result, relevant. Entrance prices for many important assets (e.g., inventories, securities, and other assets that usually are replaced in kind) are trustworthy and relevant to investors in going concerns. They could (and, I believe, should) be recorded at entrance values in the balance sheet, with holding gains or losses reported in the income statement, consistent with the matching concept. For example, if there were a realized loss on a derivative that hedged an asset that increased in value by at least as much as the loss, the loss amount would be recorded as a deferred expense or as an increase in the asset.

In contrast, the exit prices that Rosenfield and the FASB proposes not only often are not trustworthy, but are not relevant to investors in going concerns. Furthermore, exit prices are difficult to apply consistently and are subject to manipulation by opportunistic or dishonest managers. Those problems are shown in an analysis of the illustrations offered in Appendix A (Implementation Guidance) to the FASB’s Statement of Financial Standards 157 (September 2006). I analyzed each of these examples that were chosen by the FASB staff (Benston, 2007). Several of the examples use present values and entrance costs rather than the called-for exit prices. Transactions costs are supposed to be, but occasionally are not, excluded. Most importantly, in situations where there are not ready markets in which similar goods and services are traded, managers are supposed to determine the prices that hypothetical firms operating in hypothetical markets might offer. Considering that Rosenfield would have the accounting profession adopt exit prices, I expected him to show, as did the FASB staff, how this repricing could be implemented. Had he done so, I believe he would have recognized the basic shortcomings of his proposed change.

Reference

- Benston, G. J. (2007) The Shortcomings of Fair-value Accounting Described in SFAS 157 Working paper, Goizueta Business School, Emory University.

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¹ At the time of the printing of this response, we learnt with a great sadness that Professor George Benston passed away on February 12, 2008. We express our deepest sympathy to his family.

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Financial Reporting and Corporate Governance. Thomas A. Lee, John Wiley and Sons, Chichester, England (2006), xxi+ 286 pages, GBP 29.00, ISBN 10: 0-470-02681-2

Readers attracted by the title of the book because they are interested in the relationships between financial reporting and corporate governance might be somewhat disappointed by reading Thomas Lee’s book. They will not find any in-depth analysis aimed at determining

whether and how accounting figures and related disclosures can help mitigate corporate governance problems. Despite its title, the book is primarily a text-book devoted to students and practitioners with no accounting background "who need some understanding of accounting" (p. xix). It is aimed at helping them "access financial statements without the fear, uncertainty, and skepticism that too often causes financial results to be misinterpreted, misused and, more often, ignored" (p. xix). In conformity with this goal, the book provides a presentation of the financial reporting environment and process, a review of the purposes and contents of financial statements, an explanation of the objectives and methods of corporate auditing, notably in the context of creative accounting. The book provides at last an introduction to the basic tools of financial statement analysis. Actually, the book title seems motivated by the fact that each topic under study refers to subjects more or less directly related to corporate governance, financial reporting being by nature one of the corporate governance instruments.

The material covered is organized in 10 chapters. The introductory one focuses on the corporate environment and the various needs of financial statement users. Chapter 2 is the only one specifically dedicated to corporate governance. It reviews the mechanisms used to ensure that managers' decisions are consistent with shareholders' interests. Chapter 3 describes the objectives of financial accounting. It focuses on the main accounting conventions, and on the numerous legal or regulatory provisions governing the production of accounting information. Each of the chapters 3 to 7 is devoted to a specific financial statement: income statement (chapter 4), cash flow statement (chapter 5), balance sheet (chapter 6), other corporate statements (comprehensive income statement, shareholders' equity statement, and statement of accounting policy...) (chapter 7). These 4 chapters explain the main characteristics, uses, conventions and regulations affecting each statement. Chapter 8 analyzes the nature and purpose of corporate audit. It deals with the need for independent and competent auditors, the legal and regulatory responsibilities of auditors, and the relationships between external auditors, internal auditors and audit committee. Chapter 9 is less usual in textbooks introducing financial accounting. It is entirely dedicated to the management of earnings and financial statements. This chapter provides the author with the opportunity to analyze both the flexibility inherent in accounting rules and practices, and the motivation for creative accounting. It also points out the role of auditors in validating the quality of financial report content. At last, chapter 10 shows how accounting numbers can be used to gauge the financial position of a company.

A major strength of Thomas Lee's book comes from the clear presentation of the main financial accounting issues. In addition to discussion questions, problems and related additional literature, each chapter includes numerous examples aimed at illustrating the practical aspects of the topics being addressed. As such, this book is a valuable resource for those who wish to acquire skills in reading and interpreting financial accounting reports, even though they will probably need complementary training before becoming definitely familiar with accounting figures and practices, and with the financial reporting process.

Pascal Dumontier
HEC School of Management, University of Geneva, Switzerland

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A woman dances with her son

**because of brain surgery that
reduced her epileptic seizures**

**performed by a neurosurgeon who was
able to pinpoint the foci of the seizure**

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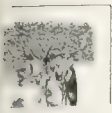
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The impact of the Multi-jurisdiction Disclosure System on audit fees of cross-listed Canadian firms ☆

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Abstract

The *Multi-jurisdiction Disclosure System* (MJDS), a treaty between Canada and the United States (U.S.), was intended to facilitate the cross-listing of a firm's securities in the neighboring country. Under this system, eligible Canadian companies are allowed to use home-country documents to meet U.S. disclosure requirements and these documents are generally not reviewed by the *Securities and Exchange Commission* (SEC). We posit that the single-reporting requirement and lower SEC scrutiny may result in lower audit fees for MJDS firms. Based on audit-fee disclosures mandated by the SEC rule-making authority granted by the Sarbanes–Oxley Act of 2002, we find a negative association between audit fees paid by U.S. cross-listed Canadian companies and their use of the MJDS. This result suggests that the lower audit fees provide an economic incentive to use the MJDS. Thus, our study provides evidence that the implementation of the MJDS may help facilitate cross-border listings by reducing audit costs. Additionally, this study confirms, for Canadian firms, some of the audit-fee determinants reported in earlier studies.

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Keywords: MJDS; Audit fees; Audit-fee determinants; Cross-listing; Cross-listed Canadian firms; Disclosure systems

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1. Introduction

Canada and the U.S. implemented the *Multi-Jurisdiction Disclosure System* (MJDS) in 1991 to facilitate cross-listing of firms' securities in both countries (Securities and Exchange Commission, 1991, 1993). A motivation for implementing the MJDS was to reduce registration and reporting costs associated with cross-listings. Under the MJDS, eligible U.S. cross-listed Canadian firms can use Canadian documents to meet standard U.S. reporting requirements for foreign issuers.¹ MJDS documents are generally not subject to review by the *Securities and Exchange Commission* (SEC). We posit that the single-reporting requirement and lower SEC scrutiny may result in lower audit fees for MJDS firms.

Regulators as well as researchers have questioned the benefits of the MJDS and there is debate about whether to continue with the system (see the "Aircraft Carrier Release"; Houston and Jones, 1999). Based on a survey of Canadian firms, Houston and Jones (1999) conclude that managers perceive no significant benefits of the MJDS for Canadian firms. On the other hand, in a report to the *Ontario Securities Commission* (OSC), Puri and Sen (2003) find that using the MJDS to meet U.S. annual disclosure requirements results in some financial savings. However, Puri and Sen do not observe substantial savings in accounting and auditing fees for MJDS firms based on interviews with three Canadian MJDS issuers and senior partners at an international accounting firm.

Canadian firms listed on U.S. exchanges are obligated to meet certain filing requirements specified by the SEC. Under the rule-making authority granted to it by the Sarbanes–Oxley Act of 2002 (SOX), the SEC required cross-listed Canadian firms to disclose auditor-fee data.² These disclosure requirements present an opportunity to empirically investigate the nature and determinants of audit fees for cross-listed Canadian firms. The limited evidence for the determinants of audit fees for Canadian firms is both dated and based only on survey data (Chung & Lindsay, 1988; Anderson & Zeghal, 1994). In this study, we examine the determinants of audit fees based on fee data disclosed by Canadian companies listed in the U.S. Specifically, we examine whether using the MJDS results in lower audit fees while controlling for other known audit fee determinants.

Our sample consists of 118 Canadian firms cross-listed in 2002 and 2003, yielding 195 firm-year observations. Of these, 78 are MJDS firms, with 134 firm-year observations, and 40 are non-MJDS firms, with 61 firm-year observations. We find evidence that audit

¹ With the MJDS, the U.S. permits Canadian companies to issue securities in the U.S. under Canadian rules, and Canada permits U.S. companies to issue securities in Canada under U.S. rules. Although the MJDS also applies to U.S. firms cross-listing their securities on Canadian exchanges, this research is limited to Canadian firms cross-listing in the U.S. Hereinafter, the MJDS refers to the system available to Canadian firms listing in the U.S.

² The SEC Final Rule of 2000 (File No. S7-13-00) required these disclosures for SEC registrants filing proxy statements on or after February 5, 2001. The SEC Final Rule of 2002 (File No. S7-49-02) required firms not issuing proxy statements to include these disclosures in their annual filings included in Form 20-F and Form 40-F. For Final Rule on "Revision of the Commission's Auditor Independence Requirements", see <http://sec.gov/rules/final/33-5919.htm> and for Final Rule on "Strengthening the Commission's Requirements Regarding Auditor Independence", see <http://www.sec.gov/rules/final/33-8183.htm>.

fees paid by MJDS firms are significantly lower than those paid by non-MJDS firms. This result implies that Canadian firms utilizing the MJDS obtain significant economic benefits in the form of lower audit fees. We also find that firm size, book-to-market ratio, reporting lag, and overall industry effect are significant in explaining audit fees.

This paper makes several contributions to the extant literature. First, while SEC reporting and disclosure requirements are costly barriers for foreign firms considering entering the U.S. capital markets (Bhushan & Lessard, 1992), there is debate as to whether the MJDS is effective in facilitating cross-border listings. The lower audit fees for MJDS firms documented in this paper contributes to the debate and provides support for the continuation of the system. Second, the results of this study may be useful for firms that are considering cross-listing, for audit firms taking cross-listed firms as clients, and for regulatory authorities. Third, DeFond and Francis (2005) in a recent paper argue in favor of more research on the effects of alternative institutional arrangements on auditing. In this spirit, we analyze and confirm some of the underlying determinants of audit fees for a new institutional arrangement. Finally, this study confirms for Canadian firms some of the audit fee determinants reported in earlier studies.

The remainder of the paper is organized as follows. Section 2 provides background and presents the research hypothesis. Section 3 describes the research design and presents the empirical results. Section 4 concludes the paper.

2. Background and research hypothesis

The MJDS allows eligible issuers to satisfy registration and reporting requirements by providing the SEC with disclosure documents prepared under Canadian securities laws. At the time the SEC adopted the MJDS, Canada adopted a parallel MJDS for U.S. issuers. Together, the system provides that issuers in the U.S. and Canada are principally subject to the specific disclosure requirements of only their home country. A Canadian issuer is eligible to use the MJDS to make public offering of any security in the U.S. if it has a minimum public float of \$75 million (USD) and a minimum 12-month reporting history in Canada.^{3,4}

Canadian firms utilizing the MJDS have to file Form 40-F with the SEC. Form 40-F is an integrated form used both as a registration statement and as an annual report by eligible Canadian issuers. It thus serves as a “wraparound” for the Canadian companies’ public reports. Canadian issuers submit annual reports prepared according to Canadian *Generally Accepted Accounting Principles* (CGAAP) to the SEC.⁵ However, some Canadian

³ The “public float” of specified securities is defined as the market value of those securities held by persons other than affiliates of the issuer. For this purpose, an “affiliate” of an issuer is anyone who beneficially owns, directly or indirectly, or exercises control or direction over, more than 10% of the outstanding equity shares of the issuer. The determination of an issuer’s affiliates is made as of the end of such issuer’s most recently completed fiscal year. See footnote 3 of Chifor (2001) for MJDS eligibility criteria.

⁴ There has been a recently proposed amendment to the MJDS that would increase the public-float requirement from \$75 million to \$250 million (Chifor, 2001).

⁵ Although MJDS issuers submit annual reports prepared according to Canadian GAAP to the SEC, they are still required to reconcile differences between Canadian GAAP and U.S. GAAP in Form 40-F.

companies eligible to use the MJDS choose not to do so.” A Canadian company ineligible to use the MJDS is required to file disclosure documents either as a foreign private issuer using Form 20-F or as a U.S. domestic issuer using Form 10-K, which is based on U.S. GAAP. Given these process and disclosure differences, these three regulatory possibilities may give rise to differences in audit fees.

Simunic (1980) posits that audit fees are an increasing function of the level of audit effort faced by an auditor. Effort differences between MJDS and non-MJDS audits may arise from differential *Generally Accepted Accounting Standards* (GAAS), GAAP, and time constraints to file annual reports with the SEC. Canadian issuers using Form 20-F and Form 40-F have to reconcile differences between Canadian GAAP and U.S. GAAP. The MJDS allows Canadian GAAP financial statements, including the reconciliation to U.S. GAAP, filed with Form 40-F to be audited in accordance with Canadian GAAS, whereas financial statements in Form 10-K and reconciliations in Form 20-F are audited according to U.S. GAAS (Puri & Sen, 2003). If the effort required to apply different GAASs varies, then we would expect to find differences in audit fees. The direction in effort of these differences is an empirical question. Puri and Sen (2003) argue that “U.S. GAAS has different standards than Canadian GAAS...as a result of different standards imposed by U.S. GAAS, there is an incremental cost associated in moving from a Canadian GAAS audit under MJDS to a U.S. GAAS audit...” If this argument holds, we would expect to find lower audit fees for MJDS firms.

The preparation of financial statements and any reconciliation, whether according to Canadian GAAP or U.S. GAAP, is the responsibility of the filing firm’s management. Anecdotal evidence suggests that preparation of financial statements according to U.S. GAAP may be cumbersome for Canadian firms. For example, Deloitte & Touche, LLP, an independent registered chartered accounting firm based in Toronto, Canada, notes in its 2004 report to the shareholders of Nortel Networks Corporation (a non-MJDS firm) that management has recognized material weaknesses in the form of “lack of sufficient personnel with appropriate knowledge, experience and training in U.S. GAAP and lack of sufficient analysis and documentation of application of U.S. GAAP to transaction...” Such deficiencies may lead to increased audit work and higher fees for non-MJDS Canadian issuers.

Additionally, while the SEC allows MJDS firms 180 days from the end of their fiscal year to file Form 40-F, the time period allowed for Form 10-K filers is only 90 days. If filing in a shorter period requires additional audit effort or costs, Canadian non-MJDS filers may have to pay an audit premium. Furthermore, the SEC has implemented Regulation G, amending filing rules and requiring public companies that disclose or release non-GAAP financial measures to also include the most directly comparable GAAP financial measures in that disclosure or release.⁵

⁵ Some Canadian firms eligible to use the MJDS have filed Form 10-K as a U.S. domestic issuer. Puri and Sen (2003) suggest that this may be because such foreign issuers want to look like domestic firms. Houston and Lamm (2005) find that a 234 out of 249 firm files form 10-K because U.S. stockholder ownership hovers around 50%. In this sample of 234, 118 of the firms have ownership dips below 50% when it could theoretically file other forms. Data limitations do not permit us to infer why eligible firms choose not to utilize the MJDS.

⁶ See Nortel’s comment for the company at <http://www.nortel.com/corporate/investor/reports/collateral/2004annualReport.pdf>.

⁷ See description of regulation G at <http://www.sec.gov/rules/final/33-8176.htm>.

Firms using the MJDS are exempt from this requirement. If these additional disclosures require audit, there may be more audit work and fees for companies not using the MJDS.

Simunic (1980) also posits that audit fees are an increasing function of expected litigation losses faced by auditors. Pratt and Stice (1994) point out that auditors assess the expected liability loss and may raise the level of effort to reduce it. It follows that audit-fee differences may be observed when these factors vary across clients for a given audit period. The SEC does not generally review Form 40-F, whereas both Form 20-F and Form 10-K are reviewed by the SEC. Pincus, Holders, and Mock (1998) report that the SEC obtains enforcement leads from different sources including reviews of SEC filings.⁹ Bonner, Palmrose, and Young (1998) observe that enforcement actions by the SEC have resulted in higher litigation by investors. The difference in the level of SEC scrutiny may give rise to perceived reduction in litigation risk between a Canadian cross-listed firm using the MJDS versus one using an alternative disclosure mechanism. The reduction in expected auditor litigation loss with use of the MJDS may decrease audit fees.

In summary, utilizing the MJDS may result in lower expected litigation loss and less audit effort leading to lower audit fees. This was not the findings of prior research, however; Houston and Jones (1999) utilize data from a survey of Canadian managers and report no benefits of the MJDS for Canadian firms listing in the U.S. They observe no significant increase in the U.S. cross-listing by Canadian companies following the implementation of the MJDS and only a few of the firms that responded to their survey indicated that the MJDS affected their decision to list on the U.S. exchanges. On the other hand, in a report to the Ontario Securities Commission (OSC), Puri and Sen (2003) find that using the MJDS to meet U.S. annual disclosure requirements offers some financial savings. To do the cost-benefit analysis of utilizing Form 40-F, instead of Form 20-F, they conducted extensive interviews with numerous relevant stakeholders, including issuers, security lawyers, senior public-accounting firm partners, and investment bankers. Additionally, Puri and Sen also gather limited information from interviews of three Canadian MJDS issuers and senior partners at an international accounting firm. Based on those interviews, they do not observe substantial savings in accounting and auditing fees by firms using the MJDS.

Given the limitations inherent in prior research (such as using survey data), we want to offer a more rigorous test of the cost differential for MJDS firms. We formulate the following hypothesis (in the alternative form) to investigate whether there are any benefits to firms utilizing the MJDS through the reduction in audit fees after controlling for other known determinants of audit fees:

H1. After controlling for other determinants of audit fees, there is a negative association between utilization of the MJDS and audit fees.

The minimum public-float requirement creates a selection system in favor of larger firms. Any analysis of audit-fee differences between MJDS firms and non-MJDS firms needs to mitigate the self-selection bias. We address this issue in Section 3.4 as part of additional analyses.

⁹ Palmrose and Scholz (2004) find significant association between restatements, in general, and litigation. Palmrose, Richardson and Scholz (2004) point out that "The SEC sometimes requests a restatement after reviewing company filings".

3. Research design and empirical results

3.1. Research design

In this section we present an audit-fee model to test our hypothesis. The determinants of audit fees are drawn from Simunic (1984), Palmrose (1996), Craswell and Frances (1999), DeFond, Raghunandan, and Subramanyam (2002) and Whisenant, Sankaraguruswamy, and Raghunandan (2003) among others as follows:

$$\begin{aligned} \text{LNAUDIT} = & \alpha_1 + \alpha_2 \text{LNNAF} + \alpha_3 \text{LNTA} + \alpha_4 \text{BIG4} + \alpha_5 \text{ROA} \\ & + \alpha_6 \text{RETURN} + \alpha_7 \text{VOLATILITY} + \alpha_8 \text{LEV} + \alpha_9 \text{INVREC} \\ & + \alpha_{10} \text{INSTIT_PCT} + \alpha_{11} \text{SPECIAL} + \alpha_{12} \text{BM} + \alpha_{13} \text{SQSEGS} \\ & + \alpha_{14} \text{FOROPS} + \alpha_{15} \text{EMPPPLAN} + \alpha_{16} \text{LAG} + \alpha_{17} \text{INITIAL} \\ & + \alpha_{18} \text{D2003} + \alpha_{19} \text{MJDS} + \varepsilon \end{aligned} \quad (1)$$

In Eq. (1), the independent variables represent agency costs, complexity of operations, size, risk, performance, and the characteristics of the auditor. Consistent with earlier research, we define the variables as follows:

LNAUDIT the natural log of the audit fees (\$ actual);¹⁰

LNNAF the natural log of the sum of all nonaudit fees paid to the auditor (\$ actual);

LNTA the natural log of total assets (\$ thousands);

BIG4 an indicator variable equal to one when an auditor is a member of the Big 4, zero otherwise;

ROA operating income divided by total assets;

RETURN the firm's raw stock return over the fiscal year;

VOLATILITY the variance of the residual from the market model over the current fiscal year;

LEV total debt divided by total assets;

INVREC inventory plus accounts receivables divided by total assets;

INSTIT_PCT the percentage of institutional holdings;

SPECIAL an indicator variable equal to the absolute value of negative special items divided by total assets, zero otherwise;

BM the book-to-market ratio;

SQSEGS the square root of number of segments;

FOROPS an indicator variable equal to one if the firm has foreign operations as indicated by foreign currency adjustments to income, zero otherwise;

EMPPPLAN an indicator variable equal to one if the firm has a pension or post retirement plan, zero otherwise;

LAG number of days between fiscal year-end and earnings announcement date;

INITIAL an indicator variable equal to one if the audit engagement is the initial two years, zero otherwise;

¹⁰ If audit fees were reported in Canadian dollars, we converted audit fees to USD using prevailing currency-exchange rates on the year-end dates. All other data obtained for this study were expressed in USD. Hereinafter, all currency amounts are expressed in USD.

- D2003 an indicator variable equal to one if the firm's current fiscal year is reported as 2003, zero otherwise;
- MJDS an indicator variable equal to 1 if the firm utilized MJDS, zero otherwise.

MJDS is our variable of interest and a significantly negative coefficient (α_{18}) will confirm our hypothesis of a negative association between utilization of the MJDS and audit fees after controlling for other known determinants of audit fees. Eq. (1) includes various control variables to minimize the possibility that the experimental variable proxies for some other effect. Prior research suggests that audit fees are positively related with client size (Simunic, 1980), therefore we include LTNA to control for firm size with a predicted positive sign. The extant literature also indicates that audit fees increase with audit complexity. As in other studies we control for complexity by including INVRFC, SQSEGS, FOROPS, and EMPPLAN with predicted positive signs. The audit literature documents that audit fees increase with audit risk and decrease with firm performance. As suggested by Whisenant et al. (2003), we include ROA, RETURN, VOLATILITY, LEV, and BM to control for audit risk and firm performance. As longer reporting lags are associated with higher audit fees, we include LAG (Gul, 1999). We include LNNAF to control for the effect of nonaudit fees on audit fees (DeFond et al., 2002; Whisenant et al., 2003). BIG4 is included as earlier studies have reported fee premia paid to larger audit firms (Whisenant et al., 2003). As suggested by DeAngelo (1981), we include INITIAL to control for any discounting of audit fees because of low-balling at the time of initial engagement of auditors. Following DeFond et al. (2002) and Whisenant et al. (2003), we include INSTIT PCT and SPECIAL with positive predicted signs. Since we are pooling observations across two periods, we include D2003 to control for any period effect.

3.2. Sample

To construct our sample, we searched for auditor-fee data for all the 675 Canadian incorporated firms (1350 firm-years for 2002 and 2003) present in the active and research files of the Compustat database for the year 2003.¹¹ We include data from 2002 and 2003 in our analysis to increase the sample size and to assess the stability of parameter estimates. We exclude observations with no Compustat data from our sample, thereby reducing the number of observations to 498 firm-years. We use two sources to obtain the auditor-fee data for our sample firms. First, we obtained auditor-fee data from the Compustat-provided audit and nonaudit-fee database. Then, we searched the SEC Edgar database for proxy statements and, Form 10-K and Form 40-F filings to obtain auditor-fee data for the remaining firms. We could obtain fee data for 268 firm-years. For our analysis, we obtain firm-level accounting data from Compustat, institutional holding data from Compact Disclosure, and market data from the CRSP database. Excluding firms that have data missing from these databases reduces the final sample to 195 firm-years. The final sample has 118 firms (78 MJDS and 40 non-MJDS firms), yielding 134 firm-years for MJDS firms and 61 firm-years

¹¹ The SEC Final Rule of 2002 requires U.S. cross-listed firms with fiscal year ending after December 15, 2003, to implement provisions of SOX, including disclosure of auditor-fee data for the two most recent years.

Table 1
Sample selection from 2002 and 2003

	Firm-years
Firm-years in 2004 version of Compustat for 675 Canadian firms	1350
Less: Firm-years for inactive firms	(852)
Firm-years for active firms	498
Less: Firm-years with missing auditor-fee data	(230)
Firm-years with auditor-fee data	268
Less: Firm-years with missing institutional ownership data	(31)
Less: Firm-years with missing CRSP data	(28)
Less: Firm-years with missing Compustat data	(14)
Firm-years in final sample of 114 firms	195
Firm-years for MJDS firms	134
Firm-years non-MJDS firms	61
Number of observations common to 2002 and 2003	82

for non-MJDS firms. Thus, as reported in Table 1, our final sample consists of 195 firm-years from fiscal years 2002 and 2003 for which we have complete accounting, institutional, and market data. There are 82 firms with complete data for both years.

Table 2
Sample distribution of audit fees

Industry	MJDS		Non-MJDS		Difference
	Number of observations	Median audit fees (\$)	Number of observations	Median audit fees (\$)	p-value median test
<i>Panel A: Distribution of audit fees by disclosure system and industry</i>					
Mining and construction	25	282,000	4	157,550	0.32
Food			2	1,065,972	
Textiles and printing	12	1,061,266			
Chemicals	4	475,000	1	50,650	0.41
Pharmaceuticals	14	124,771	3	51,344	0.61
Extractive	9	689,655	8	245,640	0.01***
Durable manufacturers	24	531,965	14	270,159	0.18
Transportation	14	1,348,146	5	627,878	0.71
Utility	7	976,600			
Financial	7	3,866,633	6	296,265	0.00***
Retail	2	189,471	2	380,500	0.08*
Services	12	632,376	4	833,602	1.00
Computers	4	263,500	12	486,588	0.26
<i>Panel B: Audit fees paid by disclosure system and auditor type</i>					
BIG4	124	561,489	57	368,281	0.02**
Non-BIG4	10	446,500	4	63,059	0.02**
<i>Panel C: Audit fees paid by disclosure system and fiscal year</i>					
2002	59	537,925	36	239,235	0.04**
2003	75	593,752	25	484,176	0.01***
Change in Median (%)		10.38		102.39	

***, **, * Significance at the 0.01, 0.05, and 0.10 levels, respectively, using two-tailed tests.

Table 3
Sample distributions of fees and control variables

Variable	MJDS			Non-MJDS			p-value difference test	
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	Mean	Median
Audit fees (AUDIT)	\$1,120,825	\$561,489	\$1,852,054	\$783,950	\$263,000	\$1,680,461	0.21	0.02***
Nonaudit fees (NAF)	\$986,333	\$373,000	\$2,076,348	\$827,385	\$167,506	\$2,835,939	0.70	0.00***
Natural log of AUDIT (LNAUDIT)	13.13	13.24	1.28	12.58	12.48	1.26	0.01***	0.02***
Natural log of NAF (LNNAF)	12.76	12.83	1.54	11.94	12.03	1.62	0.00***	0.00***
Total assets (TA) (\$000)	\$5,444,070	\$1,006,840	\$12,499,906	\$1,166,115	\$190,748	\$3,301,347	0.00***	0.00***
Natural log of TA (LNTA)	13.90	13.82	1.96	11.93	12.16	1.90	0.00***	0.00***
Square root of segments (SQSEG)	2.58	2.00	1.75	2.30	1.00	1.56	0.26	0.47
Debt to assets (LEV)	0.45	0.42	0.23	0.46	0.41	0.29	0.72	0.68
Inventory and receivable intensity (INVRPIC)	0.15	0.10	0.12	0.24	0.21	0.18	0.00***	0.00***
Return on assets (ROA)	1.34 ^a _%	4.76 ^a _%	15.04 ^a _%	4.20 ^a _%	5.47 ^a _%	25.98 ^a _%	0.13	0.61
Institutional ownership (INSTITPCT)	22.20 ^a _%	20.27 ^a _%	16.62 ^a _%	18.94 ^a _%	15.01 ^a _%	17.57 ^a _%	0.23	0.18
Return volatility (VOLATILITY)	0.001	0.001	0.001	0.003	0.001	0.004	0.00***	0.00***
Book-to-market (BM)	0.67	0.58	0.46	0.66	0.41	0.91	0.89	0.18
Reporting lag in days (LAG)	54	45	25	61	58	25	0.09*	0.02**
Fiscal year stock return (RETURNS)	60.28 ^a _%	43.99 ^a _%	103.05 ^a _%	29.57 ^a _%	3.47 ^a _%	106.25 ^a _%	0.06*	0.02**
First or second year audit (INITIAL)	6 ^a _%			5 ^a _%			0.76	
Big 4 audit firm (BIG4)	93 ^a _%			93 ^a _%			0.82	
Employee benefit plan (EMPPLAN)	51 ^a _%			31 ^a _%			0.01***	
Foreign operations (FOROPS)	62 ^a _%			61 ^a _%			0.87	
Special items (SPECIAL)	0.02			0.07			0.05**	

***, **, *Significance at the 0.01, 0.05, and 0.10 levels, respectively, using two-tailed tests

Table 2 shows the distribution of audit fees for MIDS and non-MIDS sample firms by industry, auditor, and fiscal year. As reported in panel A of Table 2, two industries (durable manufacturers and mining and construction) have higher firm-year observations than other industries. The mining and construction industry has the highest number (25) of MIDS firm-year observations and relatively fewer non-MIDS firm-year observations (4). Firms in two industries, textile and printing and utility, use the MIDS exclusively, while firms in one industry, food, are all non-MIDS. There are notable differences in median audit fees for MIDS and non-MIDS observations in different industries. For three industries (retail, services and computers) median audit fees are higher for non-MIDS observations than for MIDS observations, whereas for all the other industries the opposite is true. Panel B of Table 2 presents the composition of audit fees by type of auditor in different disclosure systems. Median audit fees for MIDS firms are significantly higher (p -value < 0.05) than median audit fees for non-MIDS firms for both Big 4 and non-Big 4 auditors. Panel C of Table 2 shows audit-fee composition by fiscal year for the two disclosure systems.

Table 3 reports descriptive statistics for all variables of interest by disclosure system. The median audit fees paid to auditors by MIDS firms is \$561,489, which is significantly higher than the \$163,800 of audit fees paid by non-MIDS firms. This may be attributable in part to size differences between MIDS and non-MIDS firms. On average the total assets of MIDS firms are larger than those of non-MIDS by a factor of 4.⁷ We also find significant differences across disclosure systems in pre-audit fees, inventory and receivable intensity, return volatility, reporting lag, fiscal year stock return, employee-benefit plans, and special items. The higher new financing for MIDS firms may be the result of the relative ease with which MIDS firms can issue equity and debt in U.S. financial markets in contrast to non-MIDS firms. The longer reporting lag for non-MIDS firms may be an indication of the extra time needed by auditors for non-MIDS firms to prepare additional disclosures. We find that INITIAL, BIG4, and FROOPS are similar for MIDS and non-MIDS firms.

3.3. Regression results

Table 4 presents the results of estimating Eq. (1) using *ordinary least squares* (OLS) regressions with pooled data for fiscal years 2002 and 2003. Pooling observations across time may lead to dependence among observations. To mitigate this potential effect, we include a dummy variable, D2003. We also separately estimate Eq. (1) for each year. To control for possible industry effects, we include 12 dummy variables to represent membership in 12 industry classifications (see panel A of Table 2). These results are included in Table 4. The tests of overall model fits result in F -statistics ranging from 16.79 to 25.95, all statistically significant (p -value < 0.01), indicating that the variations in audit fees are adequately explained by the set of independent variables included in the tested models. We find an adjusted R^2 ranging from 0.82 to 0.85 for the three regressions estimated. The White (1980) test fails to reject the null hypothesis of homoskedasticity in the data. Therefore, we report standard t -statistics. To test the possibility of multicollinearity, we compute the variance inflation factor (VIF) for each of our variables. The highest VIF is less than 10, generally, <0.02, indicates that VIFs of greater than 10 indicate a multicollinearity problem. Therefore, multicollinearity does not appear to be a problem with our data. We also test the structural stability of our model using the Chow test. We find

Table 4
Audit-fee model

	Predicted sign	Years 2002 and 2003		Year 2002		Year 2003	
		OLS estimate	t-statistics	OLS estimate	t-statistics	OLS estimate	t-statistics
INTERCEPT	+	3.353	5.37***	2.0	1.70***	2.07	1.70***
LNNAF	+	0.024	5.62***	0.073	2.42***	0.205	2.17***
LNTA	-	0.501	10.75***	0.421	5.41***	0.491	7.12***
SQSEGS	+	0.024	0.003	0.007	0.0007	0.007	0.001
LEV	-	-0.161	-0.63	-0.20	-0.57	-0.57	-1.22*
INVREC	-	0.405	0.99	-0.077	-0.11	0.763	0.91
ROA	+	-0.223	-0.77	-0.010	-0.003	-0.077	-0.20
INSTIT_PCT	+	-0.004	-1.43*	-0.006	-0.006	-0.007	-0.57
VOLATILITY	-	31.033	1.27**	24.211	0.92	74.333	1.06
BM	+	0.057	3.25***	0.035	2.70***	0.036	1.00***
LAG	+	0.004	2.02**	0.004	1.48*	0.003	0.92
RETURN	+	0.057	1.19	-0.130	-1.17	0.001	0.01
INITIAL	+	0.025	1.28*	-0.007	-0.007	-0.185	-0.77**
BIG4	-	-0.127	-0.78	-0.07	-1.01**	-0.077	-0.45
EMPLPLAN	-	-0.001	-0.01	-0.140	-0.73	0.106	0.54
FOROPS	-	0.137	1.49*	0.47	2.72***	-0.060	-0.93
SPECIAL	+	0.023	-0.51	-0.133	-0.20	0.57	0.85
D2003	+	0.121	3.9				
MJDS	+	-0.048	-4.42***	0.054	1.13***	-0.187	-2.17**
MINE_CONS	+	-0.563	-1.90*	-0.25	-0.92	-0.56	-2.0*
FOOD	+	0.424	0.88	0.045	0.71	0.572	0.75
TEN_PRINT	+	0.187	0.57	0.005	0.02	-0.001	-0.00
CHEMICAL	+	-0.452	-1.19	-0.137	-0.24	-0.573	-1.01
PHARMA	+	-0.405	-1.33	-0.521	-1.20	-0.475	-0.97
EXTRACT	+	-0.882	-2.24**	-0.503	-1.17	-0.632	-1.4
DUR_MAN	+	-0.147	-0.52	-0.093	-0.23	-0.124	-0.27
TRANSP	+	-0.241	-0.77	-0.508	-1.14	-0.132	-0.27
UTILITY	+	-0.220	-0.62	0.258	0.41	0.255	0.502
FIN	+	-0.094	-0.30	-0.150	-0.34	-0.062	-0.13
SERVICES	+	0.174	0.56	0.102	0.23	0.103	0.24
COMPUTER	+	0.005	0.02	-0.341	-0.74	0.22	0.45
Observations		195		95		100	
F-statistic		35.95		19.85		19.79	
p-value		0.00		0.00		0.00	
Adjusted R ²		0.84		0.85		0.82	

***, **, *Significance at the 0.01, 0.05, and 0.10 levels, respectively, based on one-tailed tests and standard predictions, two-tailed tests otherwise.

no evidence of structural changes between 2002 and 2003 (*p*-value=0.65). Our main variable of interest, MJDS, has a significantly negative coefficient (*p*-value=0.05, one-tailed) for the pooled data, as well as for individual years. This provides support for H1 indicating that the U.S. cross-listed Canadian companies utilizing the MJDS pay lower audit fees than non-MJDS firms after controlling for other audit-fee determinants. The lower audit fees paid by MJDS firms provide an economic advantage for those firms availing themselves of this cross-listing mechanism.

We also find that the coefficients of LNNAF, LNTA, BM, and LAG are significantly (p -value < 0.05 , one- or two-tailed) different than zero. The coefficient of LNNAF is positively significant, using two-tailed tests, for pooled and individual year observations. This result is consistent with prior research on the relationship of nonaudit and audit fees, indicating possible knowledge spillovers (Simunic, 1984). The significantly positive coefficient on firm size is consistent with earlier Canadian studies that found higher audit fees for larger firms (Chung & Lindsay, 1988; Anderson & Zeghal, 1994). In contrast to the results reported in DeFond et al. (2002) and Whisenant et al. (2003), we find the coefficient on BM to be positively significant. The coefficient on LAG is positively significant, indicating higher audit fees for longer reporting lags, which is consistent with results reported in earlier studies (e.g., Gul, 1999). Even though MJDS firms are allowed a longer time period to meet their filing requirements, we observe shorter reporting lags for these firms (see Table 3), which may have an indirect effect on audit fees. The coefficient of INITIAL is negatively significant (p -value < 0.10), indicating the low-balling discount effect predicted by DeAngelo (1981).

We perform a partial F -test on the industry dummy variables and find significant industry effect (p -value < 0.01). We find significant coefficient only on EXTRACT, indicating that the extractive industry has significantly lower audit fees.

3.4. Additional analyses^{1,2}

The results in Table 3 indicate that firms utilizing the MJDS are significantly larger in size. To test for possible model misspecification with respect to firm size and endogeneity of MJDS choice, we perform three analyses. First, we calculate the correlation of the residuals obtained from Eq. (1) with firm size (LNTA). We find no correlation implying the independence of firm size and the error process. Second, to test for endogeneity of MJDS choice, we model MJDS as a function of firm size and industry membership. We use PROBIT regression to estimate the MJDS model and OLS regression for the audit-fee model (e.g., see DeFond et al., 2002). Then, we employ the Hausman (1978) test to check for endogeneity. We are unable to reject the null hypothesis of no endogeneity. Third, although the Hausman test fails to detect endogeneity of MJDS choice, we use a two-stage least-square estimation procedure to directly control for the possible misspecification. The untabulated results are qualitatively similar to the reported OLS results. Based on preceding analyses, our results are robust to possible model misspecification with respect to firm size and endogeneity of MJDS choice.

The number of observations reported in Table 1 indicates that there are 82 firms in our sample with complete data for both years. In order to ensure that the reported results are not driven by differences in firm-year observations, we estimate Eq. (1) using only those observations having data for both periods. Our main result is qualitatively similar to the result reported in Table 4.

¹ We use outlier detection and estimation methods of Huber (1973), Rousseeuw and Yohai (1984), Yohai (1987), and Rousseeuw and Van Driessen (submitted for publication). The four procedures resulted in identification of three, five, one, and 10 outliers, respectively. The resulting estimated regressions are qualitatively similar to OLS regressions reported in Table 4.

The information in panel A of Table 2 indicates that the audit-fee distribution across industries and disclosure systems warrants additional analyses to test the robustness of the results. First, mining and construction has the highest number (25) of MJDS firm-year observations and relatively fewer non-MJDS firm-year observations (4). Second, two industries, textile and printing and utility, have firms that use the MJDS exclusively, while one industry, food, has all non-MJDS. Third, for three industries (retail, services, and computers) median audit fees are higher for non-MJDS observations than for MJDS observations, whereas for all the other industries the opposite is true. We re-estimate Eq. (1) by: (i) excluding observations from mining and construction industry, (ii) excluding observations from food, textile and printing, and utility industries, and (iii) excluding observations from retail, services, and computers industries. The untabulated results remain qualitatively unchanged from those previously reported.

In Table 4, we observe a positive association between audit and nonaudit fees. Earlier research interpreted the observed association between audit and nonaudit fees as suggesting knowledge spillover between these services (Simunic, 1984; Palmrose, 1996; Davis, Ricchiute, & Trompeter, 1993; Bell, Landsman, & Shackelford, 2001). However, these inferences were based on single-equation estimation of audit-fee and nonaudit-fee models. Recent research proposes that audit and nonaudit fees may be simultaneously determined. Therefore, the relationship between audit and nonaudit fees may be biased when single-equation estimation is used (Antle, Gordon, Narayanamoorthy, & Zhou, 2002; Whisenant et al., 2003).¹³ If simultaneously determined, both audit and nonaudit fees are endogenous to a system of equations. Treating audit and nonaudit fees as endogenous does not qualitatively change our results with respect to the effect of MJDS choice on audit fees.¹⁴

4. Concluding remarks

We have extended prior research on the determinants of audit fees to consider the influence of the MJDS on audit fees for U.S. cross-listed Canadian firms. The empirical results provide support for the assertion that cross-listed Canadian companies utilizing the MJDS pay lower audit fees than do non-MJDS firms, after controlling for other known determinants of audit fees. This result implies that Canadian firms utilizing the MJDS obtain significant economic benefits in the form of lower audit fees. Foreign firms acknowledge that the SEC reporting and disclosure requirements are costly barriers to enter U.S. capital markets. The implementation of the MJDS by the SEC as a bilateral agreement

¹³ For U.S. data, Whisenant et al. (2003) report no association between audit and nonaudit fees when the system of audit and nonaudit fees equations is simultaneously estimated. In contrast, using audit and nonaudit data from the United Kingdom, Antle et al. (2002) find evidence of a significant association between audit and nonaudit fees.

¹⁴ The variables explaining nonaudit fees are identified from Parkash and Venable (1993), Firth (1997), DeFond et al. (2002), Frankel, Johnson, and Nelson (2002) and Whisenant et al. (2003) and are LNAUDIT, LNTA, BIG4, ROA, RETURN, LEV, INSTIT PCT, SPECIAL, BM, SQSEGS, FOROPS, EMPPLAN, INITIAL, MERGER, FINANCE, SALES GROWTH, and MJDS. SALES GROWTH is growth rate in sales over the previous fiscal year, MERGER equals one if the firm acquired another firm during the current fiscal year, zero otherwise, and FINANCE equals one if the firm issues either equity or long-term debt in either the current or the subsequent fiscal year, zero otherwise.

with Canadian regulatory authorities was an important step in facilitating globalization of capital markets. By showing at least one advantage related to accounting and disclosure, our study provides support for the policy adopted by the SEC. Only Canadian firms cross-listed in the U.S. disclose auditor-fee data. Therefore, the results on determinants of audit fees should be interpreted with caution, as they may not apply to other Canadian firms. Finally, this paper does not address the issue of audit fees for U.S. firms cross-listed on Canadian exchanges.

This paper does not specifically address the issue of all costs and benefits associated with MJDS choice. Future research is required on this issue. Future research could also profitably examine specific determinants of MJDS choice, the potential for similar agreements with other jurisdictions, and the influence of institutional arrangements on audit and accounting fees for cross-listed firms. The study of the effects on audit fees resulting from specific changes in institutional arrangements, like SOX and harmonization of international reporting standards, may also enhance our understanding of audit-fee determination.

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Market perceptions of discretionary accruals by debt renegotiating firms during economic downturn

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Abstract

This study addresses how a stock market prices earnings components around a sudden and severe economic downturn. In particular, the study examines the market valuation of discretionary accruals for debt renegotiating Malaysian firms during the Asian financial crisis. Our analysis shows that negative discretionary accruals for debt renegotiating firms are associated with higher market values of equity and are not related to the firms' future earnings. These findings are consistent with investors placing a positive value on the probability that negative accruals increase the likelihood that concessions can be extracted from lenders during renegotiation. In contrast, discretionary accruals for a control sample of non-debt renegotiating firms are not significantly associated with stock prices but are positively associated with future earnings.

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1. Introduction

Prior research confirms that accruals have incremental information content in explaining share prices and that accruals ability to predict future cash flows is incremental to the predictive

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ability of past cash flows (Bowen, Burgstahler, & Daley 1987; Dechow, 1994; Dechow, Kothari, & Watts, 1998; Pfeiffer, Elgers, Lo, & Rees, 1998). However, while the market values accruals positively when managers convey a credible signal of their private information about firms' future profitability, the market may value accruals negatively or ignore them if investors believe that managers use accruals to disguise the underpinning economic performance of the firm (Schipper, 1989; Holthausen, 1990; Healy & Palepu, 1993).

In this paper, we exploit a unique opportunity and database to investigate the capital market perception of financially distressed firms' discretionary accruals during a sudden and severe economic downturn. More specifically, we examine the market valuation of the discretionary accruals of Malaysian listed firms that undertook debt renegotiations following actual debt default during the Asian financial crisis and compare this with a set of similarly poor performing firms that did not undertake debt renegotiations. The uniqueness of the sample and the temporal and national setting limits the generalizability of our findings. More importantly, though, it contributes to the internal validity of assessing perceptions of capital market participants of financially troubled firms' discretionary accruals when the general economic climate becomes suddenly and severely adverse.

Consistent with prior research, we debate two conflicting theoretical arguments. If signalling theory applies, investors consider that discretionary accruals signal private information regarding the firm's future performance and the association between discretionary accruals and market value should be positive. An alternative view drawn from contracting theory is that investors expect managers to manage earnings to extract concessions from the lending agencies that might pull the firm out of its financial distress. In periods of poor performance, managers are more likely to be concerned about their firms' survival in a sluggish economy than with maintaining a reputation for credible communication (see Warner, Watts, & Wruck, 1988; Weisbach, 1988; Fudenberg & Tirole, 1995). Therefore, incentives such as maximising concessions might dominate in these periods. If the market perceives that these incentives are dominant, then the relation between market value and discretionary accruals should be negative (Gul, Leung, & Srinidhi, 2000; Balsam, Bartov, & Marquardt, 2002).

Watts and Zimmerman (1990) and Holthausen (1990) explain the signalling perspective and two contracting perspectives in detail to differentiate opportunistic and efficient contracting. Although we describe the motivations for earnings management, we are more concerned with its effects, which we do not necessarily attribute as being opportunistic or efficient because of the empirical difficulty of distinguishing the contracting incentives. We also believe that it is difficult to distinguish the opportunism and efficiency contracting perspectives because the outcome could be consistent with one contracting perspective but managers' motivations might be consistent with another (e.g., *ex ante*, if managers aim to transfer funds from lenders to shareholders this is opportunistic in relation to the debt contract).

Using a large sample of 21,135 firm-years over 1973–93, Subramanyam (1996) finds that both stock returns and future profitability are associated with discretionary accruals. Subramanyam's results are consistent with the signalling hypothesis that discretionary accruals convey credible information and improve the ability of earnings to reflect firms' economic value. Xie (2001) extends Subramanyam (1996) and reports that the market overprices discretionary accruals relative to their association with one-year ahead earnings. He concludes that the overpricing of discretionary accruals is attributable to placing value on managerial discretion. However, neither study addresses whether the market responds

differently to discretionary accruals under different circumstances. When Gul et al. (2000) investigate this issue, they examine the valuation of discretionary accruals of high growth and high debt U.S. firms. They report that discretionary accruals of high growth firms are more predictive of future profits than the discretionary accruals of low growth firms. In contrast, discretionary accruals of high debt firms are less predictive of future profits than do the discretionary accruals of low debt firms.

Ahmed and Zhou (2000) find that U.S. firms' earnings multiples are significantly higher for large income increasing discretionary accruals than for small discretionary accruals. However, the effect of income decreasing discretionary accruals depends on the reporting firm's current performance. For high-performing firms, earnings multiples are significantly lower for large income decreasing discretionary accruals than for discretionary accruals. This is consistent with investors viewing the income decreasing discretionary accruals as transitory. In periods of low performance, however, earnings multiples are significantly higher for large income decreasing discretionary accruals than for small discretionary accruals.

Our study contributes to this strand of literature by examining two distinct samples: firms that have violated debt covenants due to financial distress and sought government or lender concessions in renegotiated debt agreements, and firms that experienced similar financial trouble without violating debt covenants. Our results show that discretionary accruals during the debt renegotiation periods are generally negative and associated with higher market values of equity for debt renegotiating firms, but not for non-renegotiating firms. Together, these findings suggest that market participants perceive that managers manage discretionary accruals to achieve government or lender concessions during debt renegotiation, consistent with Giammarino (1989). Additionally, future net earnings of these firms and their discretionary accruals are not significantly correlated during the debt renegotiation period, suggesting that managers of renegotiating firms did not use discretionary accruals to signal future earnings potential to the market.

The remainder of the paper is organised as follows. Section 2 describes the Malaysian institutional setting during the Asian Financial Crisis. Section 3 discusses the incentives of the managers of Malaysian firms undertaking debt contract renegotiations after violating debt covenants and of those firms not undertaking debt renegotiation, and develops the hypotheses. Research methods and data collection are described in section 4, followed by a discussion of the descriptive statistics and correlation structure in Section 5. The empirical results and the association between firms' discretionary accruals and their future performance are presented in Section 6. Section 7 summarises and concludes.

2. Institutional background: financial crisis and corporate debt during the economic crisis in Malaysia

Malaysia had an impressive record of economic performance during the 1980s. However, the country's economy began to suffer badly with the Asian financial crisis beginning mid 1997. The immediate impact was evident from a sharp decline in the value of the Malaysian Ringgit, GNP and stock market (Bank Negara Malaysia, 2000). During the crisis, total after tax earnings of listed non-finance-sector firms declined from RM25.5 billion in 1996 to RM22.5 billion in 1997 and further to RM-11.41 billion in 1998, despite an increase in the number of firms listed on Bursa Malaysia (formerly Kuala

Lumpur Stock Exchange (KLSE)).¹ In light of an increasing number of firms facing financial difficulty, the Corporate Debt Restructuring Committee (CDRC) was formed in July 1998 to facilitate debt and corporate restructuring, and to avoid placing viable firms in liquidation or receivership. However, only firms that had at least RM50 million total borrowings were eligible to apply for CDRC assistance.

In June 1998, another body known as *Pengurusan Danaharta Nasional Berhad* (Danaharta) was established by the government to remove non-performing loans (NPLs)² from the banking system by purchasing NPLs representing outstanding borrowings of RM5 million or more.³ Most small firms did not meet these criteria and hence undertook debt restructuring directly with their lenders.

Defaulted firms that were ineligible to receive assistance from the CDRC or Danaharta could also utilize an option to restructure their debt in accordance with provisions in Section 176 of the Companies Act, 1965. Section 176(10) enables a company to obtain a restraining order from further proceedings by the creditors prior to reaching a compromise, or proposing an arrangement until approval by the Court.⁴ These firms have to undertake debt restructuring with their lenders directly.

3. Hypothesis development

Evidence indicates that secured bank lenders usually make arrangements with borrowers to facilitate their financial difficulties during economic recessions (Asquith, Gertner, & Scharfstein, 1994). Accordingly, managers may have incentives to take advantage of information asymmetries and misrepresent their firms' values in order to extract maximum concessions from lenders during debt contract renegotiations (Bergman & Callen, 1991; Giammarino, 1989). DeAngelo, DeAngelo and Skinner (1994) argue that corporate managers of troubled firms adopt income decreasing accounting practices to signal that they are serious about streamlining their firms' operations. In each of the situations described above, negative earnings management is considered "good news" for investors.

In contrast to their incentives to manage earnings downwards, managers are likely to have personal incentives to manage earnings upwards. During threats to their job security, combined with a managerial labor market slump, managers would have incentives to use income increasing accounting techniques (Fudenberg & Tirole, 1995).

To test investors' perceptions of the effects of earnings management we assess the value relevance of discretionary accruals during a sudden and severe economic downturn using firms that violated debt covenants. This context helps to test whether investors eliminate

¹ There were 621 of firms on the board in 1996, 708 firms in 1997 and 736 firms in 1998.

² Non-performing loans mean loans which are in arrears for over 6 months as defined by the International Monetary Fund (IMF). Refer to <http://dsbb.imf.org/country/mys/aabmieth.htm> for further information

³ Following the purchase of NPLs, Danaharta appoints an administrator for the defaulted firm to help overcome its operational difficulties and to develop a proposal for long-term viability. In this way borrowing firms become indebted to Danaharta, and the appointed administrator remains responsible to it for operations and performance. By the end of 1999, total non-performing loans bought by Danaharta were RM45.521 billion (Bank Negara Malaysia, 2000).

⁴ Under the Section 176 alternative, a scheme has to be approved by 75% in value and a simple majority in number of each class of creditors present and voting before a court sanction (restraining order) is sought

competing reporting incentives so as to focus on the effects of discretionary accruals on the value of their equity.

During the Asian financial crisis, the Malaysian government instituted support mechanisms to assist debt-ridden firms by facilitating debt restructuring and/or refinancing with lenders.¹ Firms that were eligible to receive such support can be expected to minimize their reported earnings to improve chances of acceptance or to obtain favorable refinancing terms (Juhl, Juhl, & Houghton, 2007). Those firms with no chance of qualifying for government aid and that renegotiated with their lenders directly can be expected, similarly, to reduce earnings in an attempt to extract maximum concessions from lenders. This incentive may be particularly more important when lenders know that debt amounts exceed the salvage value of the collateral (Shleifer & Vishny, 1992).

In summary, negative discretionary accruals of firms that violate debt covenants during an economic downturn can signal to lenders and investors a willingness to acknowledge and deal with the firm's problems. They may also assist managers involved in debt renegotiations to minimize the cost or maximize the financial benefits of the renegotiations. Positive discretionary accruals may help some managers to mitigate adverse attention to their managerial performance. Nonetheless, we expect that investors will focus more upon the direct impact upon equity values from debt concession.

We expect that the benefits to investors from downward earnings management would diminish any benefits from upward earnings management. Prior literature suggests that the government is likely to protect industries during a financial crisis (Peltzman, 1976), and there is a history of government-backed financial aid to firms in Malaysia (Gomez & Jomo, 1997; Johnson & Mitton, 2003).

Overall, in the context of this study, we also expect that investors would be aware of their firms' debt covenant violations, and would perceive that an increased probability of debt crisis came from current period negative discretionary accruals would transfer wealth to them. We predict that negative discretionary accruals are reflected in higher market values for companies that violated their debt covenants and undertook debt renegotiation. This gives rise to a positive relation between these firms' discretionary accruals and their market value, as predicted in H1:

H1: The more negative their discretionary accruals, the higher was the market value of equity for Malaysian firms that renegotiated their violated debt agreements during the Asian financial crisis.

We tested this hypothesis using a sample of firms that survived the financial crisis. While this particular sample survivorship bias increases the power of our analysis by focusing upon firms most likely to benefit from negative discretionary accruals, it suffers from selection bias that is not evaluated in this study.

During economic crisis, poor performing firms that have not violated debt covenants may also engage in income reducing activity, albeit to a lesser extent, in order to report

¹ The Government of Malaysia announced the Financial Restructuring Scheme Committee (FRC) on 7 January 1998, aimed at providing financial assistance to the government. The committee is constituted of parties at arrangements in the financial markets. However, the FRC is divided into short-term and long-term issues and to ensure sustainable economic growth of the country.

subsequently higher earnings and to blame the economic downturn for their current poor performance (Johl et al., 2007). Managers of these firms might expect the market to condone managerial discretion to reduce income during an economic recession. Reducing reported earnings may also signal to the market that managers are seriously streamlining their operations with a view to improving performance. Alternatively, managers of non-renegotiating firms also have incentives to manage earnings upwards to distinguish their performance from that of covenant-violating firms' managers. These competing incentives do not allow predicting or direction. Hence, our second hypothesis is null:

H₂. There is no association between discretionary accruals and the market value of equity for Malaysian firms that did not violate debt covenants and did not undertake debt renegotiation during the Asian financial crisis.

Regardless of investors' perceptions, if managers use discretionary accruals to signal their expectations of future performance, the following hypothesis should hold:

H₃. There is a positive association between discretionary accruals and the future operating earnings of debt renegotiating and non-renegotiating Malaysian firms during the Asian financial crisis.

4. Research design and sample selection

4.1. The valuation model

We apply a price model that uses the market value of equity (MVE) as the dependent variable and operating cash flows (OCF), non-discretionary accruals (NDAC), and discretionary accruals (DAC) as the independent variables for testing hypotheses one and two. We also include the book value of equity (BVE) in the regression model, following Barth, Beaver, and Landsman (1998a), Barth, Goster, Clement, and Kasznik (1998b) and Collins, Pincus, and Xie (1999). Following Easton (1998) and Ahmed and Zhou (2000), we deflate MVE, OCF and BVE by the book value of equity at the beginning of the period to mitigate heteroscedasticity.

Prior studies use other variables that affect discretionary accruals and which, in turn, may affect the valuation of earnings. We include several control variables: audit qualifications (AuditQ), changes in senior management (ChgMgt), leverage (Lev), size of the audit firm (Big-5), profitability (ROI) and managerial ownership (Mowner). Hodge, Martin, and Pratt (2005) report that an income decreasing accounting change accompanied by an audit qualification generates financial report user skepticism and affect users' assessments of firms' current and future financial performance. Krishnan, Percy, and Tuttleci (2002) find that equity valuation is positively associated with audit quality, as measured by whether the firm belongs to a big audit firm or not. Since our sample consists of distressed firm, we include profitability in the regression model. Chen, Guo, and Mande (2003) find managerial ownership has a significant positive effect on the market to book ratio. However, prior studies find that the positive effect of managerial ownership on performance decreases when debt increases (McConnell & Servaes, 1995). We use leverage as a control variable following Mitton (2002), who investigated firm performance in five countries, including Malaysia, during the Asian financial crisis.

The model including control variables is stated below:

$$\begin{aligned} MVE_{it} = & \alpha_0 + \beta_1 BVE_{it} + \beta_2 OCF_{it} + \beta_3 NDAC_{it} + \beta_4 DAC_{it} + \beta_5 AuditQ \\ & + \beta_6 ChgMgt + \beta_7 Lev + \beta_8 Big - 5 + \beta_9 ROI + \beta_{10} Mowner \\ & + \beta_{11} Yrdum_{it} + \epsilon \end{aligned} \quad (1)$$

Where:

- MVE is the market value of equity 90 days after the balance sheet date,
 BVE is the book value of equity,
 OCF denotes operating cash flows,
 NDAC is non-discretionary accruals,
 DAC is discretionary accruals estimated using the established accrual models explained later in this paper,
 AuditQ is a dummy variable that takes the value of 1 if the firm receives going concern audit qualifications during the year,
 ChgMgt refers to a change in executive or managing director. It takes the value of 1 if there is a new executive or managing director appointed,
 Lev is total debt-to-total assets ratio,
 Big-5 is firm-years with Big-5 audit firms,
 ROI is return on total assets, measured by operating profits before taxes divided by lagged total assets,
 Mowner is the percentage ownership held by senior executives of the firm, and
 YrDum is a dummy variable to control for a year effect, 1999 is 1 and 1998 is 0.

4.2. Computation of discretionary accruals

To estimate discretionary accruals, we first compute total accruals (TACF) calculated as the difference between income before tax and extraordinary items (EARN) and operating cash flows (OCF):

$$TACF_{it} = EARN_{it} - OCF_{it} \quad (2)$$

We next estimate non-discretionary accruals using cross-sectional versions of the Jones Model (1991) and modified Jones Model (1995) since recent evidence suggests that the cross-sectional Jones and modified Jones Models have more power in detecting discretionary accruals than other models (Jeter & Shivakumar, 1999; Bartov, Gul, & Tsui, 2001):⁶

$$TACF_{it}/A_{it-1} = \alpha_1(1/A_{it-1}) + \alpha_2(\Delta REV_{it}/A_{it-1}) + \alpha_3(PPE_{it}/A_{it-1}) + v_{it} \quad (3)$$

(Jones, 1991)

$$TACF_{it}/A_{it-1} = \alpha_1(1/A_{it-1}) + \alpha_2(\Delta REV_{it} - \Delta REC_{it})/A_{it-1} + \alpha_3(PPE_{it}/A_{it-1}) + v_{it} \quad (4)$$

(Modified Jones, 1991)

The original Jones model (Jones, 1991) requires tests of earnings management to have at least ten time series observations for each firm for reliable results. Many studies use the cross-sectional version (e.g. DeFond and Jambalvo, 1994; Rees et al., 1996) because of survivorship bias inherent in the original time-series version. In addition, the assumption of time-series model stationarity of the data is almost certain to be violated during a financial crisis period.

Where all variables in Eqs. (3) and (4) are scaled by one year lagged total assets (A_{it-1}).

TACF_{it} is total accruals,
 Δ REV_{it} is changes in total revenue,
 Δ REC_{it} is changes in accounts receivable,
 PPE_{it} is property, plant and equipment, and
 v_{it} is the residual.

We estimate the parameters using cross-sectional Ordinary Least Squares regressions for each industry-year portfolio, utilizing all firms listed on the Bursa Malaysia industrial classifications (Rees, Gill, & Gore, 1996; Kasznik, 1999) other than debt renegotiating firms. This enables us to mitigate industry-specific effects where the accruals behavior and the impact of economic recession differ across industries.

Discretionary accruals are estimated as the prediction errors (v_{it}) that are the difference between the predicted accruals using the parameter estimates from the first process, and reported accruals for each test sample firm-year. Specifically, discretionary accruals of the cross-sectional Jones (1991) and modified Jones models (1995) are the prediction errors of the total accrual model, where $\hat{\alpha}_1$, $\hat{\alpha}_2$, $\hat{\alpha}_3$ are parameter estimates of α_1 , α_2 , α_3 in (4) and (5):

$$v_{it} = \text{TACF}_{it}/A_{it-1} - [\hat{\alpha}_1(1/A_{it-1}) + \hat{\alpha}_2(\Delta\text{REV}_{it}/A_{it-1}) + \hat{\alpha}_3(\text{PPE}_{it}/A_{it-1})], \quad (5)$$

$$v_{it} = \text{TACF}_{it}/A_{it-1} - [\hat{\alpha}_1(1/A_{it-1}) + \hat{\alpha}_2(\Delta\text{REV}_{it} - \Delta\text{REC}_{it})/A_{it-1} + \hat{\alpha}_3(\text{PPE}_{it}/A_{it-1})] \quad (6)$$

Our third and fourth approaches employ working capital discretionary accruals rather than total discretionary accruals. These models use working capital movements from the statement of cash flows (Hribar & Collins, 2002), which eliminates non-operating changes in the current accounts shown on the balance sheet that may relate to mergers, acquisitions, and divestments of discontinued operations. The estimation models are similar to the original and modified Jones total accrual models except that the PPE variable is excluded from the equations because working capital accruals do not include depreciation. Discretionary accruals estimation follows closely the described procedures for total accruals.

We proceed with the parameter fitting process using all available firms' data. As all independent variables exhibit a high standard deviation and skewed distributions every year, particularly in 1999, we delete observations with DFFITS⁷ of more than 2 (following Jeter & Shivakumar, 1999) to obtain reliable and population representative parameter estimates. We also require at least 10 observations to be in the estimation sample. In total, we employ 3,514 firm-years in the parameter fitting process.

⁷ The DFFITS statistic is a scaled measure of the change in the predicted value for the i th observation. The statistic was developed by Belsly et al. (1980). For linear models, $DFFITS_i = \frac{\hat{v}_i}{\sqrt{h_{ii}}}$, where \hat{v}_i is the i th value predicted without using the i th observation. Large absolute values of F_i indicate influential observations. A general cutoff to consider is 2.

Since our estimations are made according to industry-year portfolios, we compute Z -statistics to aggregate t -statistics across all the portfolios.⁸ This procedure eliminates industry-specific effects where the accruals behaviour and the impact of economic recession are different between industries. The year portfolio mitigates (1) economy-wide effects on all firms in a particular year, and (2) recession-induced non-stationarity of data in the time-series version of the original model. The results (not tabulated) show that the estimates of the changes in revenue variable ($\Delta REV/A_{it-1}$) coefficient are generally positive in both the total accruals and working capital accruals models. These results are consistent with prior studies such as DeFond and Jiambalvo (1994), although Jones (1991) does not predict the sign of the coefficient.⁹ Overall, the average adjusted R^2 for the total accrual model is 0.324, while for the working capital accrual model, it is slightly lower (0.208).

4.3. Sample selection

To take managers' incentives into account when selecting our samples to identify discretionary accruals (Guay, Kothari, & Watts, 1996), we select our sample from the Bursa Malaysia listed firms that undertook debt renegotiations with lenders in 1998 and 1999. To identify these firms we search firms' announcements from the Bursa Malaysia website using "CDRC", "debt", "restructuring", "Section 176", "renegotiations", "rescheduling", "contract revisions" and their variation terms during the period when Malaysia experienced severe financial crisis, 1997–2001. We analyse each announcement to classify internal restructuring and external restructuring so that only firms that undertook external debt restructuring are included in the initial sample.

We collect 1997–2001 financial statements from the Bursa Malaysia Research Information Systems (Bursa Malaysia RIS) database.¹⁰ To supplement that data, we also obtain copies of the firms' annual reports held at the Bursa Malaysia library in Kuala Lumpur to extract additional information to estimate discretionary accruals and to measure the explanatory variables for the regression model. To obtain additional managerial ownership data, we use the Corporate Handbook issued by the Bursa Malaysia.

These procedures yield 36 firms that restructured debt with supervision from the CDRC (CDRC firms); 58 firms that restructured debt through direct renegotiations (Other Debt); and

⁸ There are 10 industry-year portfolios (5 industries \times 2 years) with mean observations of 99 firms. Z statistics are computed by aggregating the t -statistics across N portfolios as the following formula (t is the t -statistic for the portfolio i , k is the degree of freedom for the respective t -statistic in the portfolio i). The Z -statistic is assumed to have an asymptotic normal distribution. $Z_1 = (1/\sqrt{T}) \sum_i (t_i / \sqrt{k_i/(k_i - 2)})$.

⁹ The sign of the coefficient on revenues can be positive or negative depending on the net effect of changes in working capital accounts such as accounts receivables, inventory (both positively correlated with accruals) and accounts payable (negatively correlated with accruals).

¹⁰ This database only has key financial performance measures and does not contain full financial statements. The disc is available for purchase from the 'KLSE Shoppe' by accessing web site <http://www.klse.com.my/website/resource/pubshop.htm>. In addition to firms' financial statements, this database also contains information about their profile, subsidiaries, properties, current share price, directors in office and its history, directors shareholding, ratio analysis, and past announcements.

Table 1
Sample selection and profile

Panel A: Number of firms according to groups				# Firms
1. Debt renegotiating firms				
• Firms under Corporate Debt Restructuring Committee (CDRC)				29
• Firm restructuring debt without government supervision (other debt)				51
3. Firms that do not restructure debt agreements (control)				59
Total				139
NB All firms have at least two consecutive years of negative earnings				
Panel B: Sample firms by industry and groups				
	CDRC	Other debt	Control	Total
Properties development & construction	9	16	11	36
Consumer products	3	7	11	21
Industrial products & technology	10	12	14	36
Mining & plantation	0	6	3	9
Trading and services	7	10	20	37
Total	29	51	59	139

13 firms with loans that were purchased by Danaharta. The firms under CDRC supervision, 19 (17), began renegotiations with lenders in the 1998 (1999) financial year. There are 27 (31) Other Debt firms that began renegotiations with lenders in 1998 (1999). We exclude Danaharta-assisted firms (13 firms) from the analysis because Danaharta purchases non-performing loans from the lending institutions and appoints an administrator to operate the firm. This system relieves the firms from debts owed to the banks financial institutions, and substitutes Danaharta as the new creditor.¹¹ Further, we note that Danaharta-assisted firms were subsequently suspended from the Bursa Malaysia and the financial information and share return data of these firms are unavailable. We also exclude 14 firms for which necessary data are not available, such as share price after 90 days and operating cash flows. Therefore, the final debt renegotiating sample consists of 80 firms from 5 industries.

Comparing the survivors (80) and those 13 non-survivors (for which we could obtain information for the year prior to their delisting) reveals that the failed (delisted) firms have, on average, higher leverage, lower profitability and lower book value of equity. The differences between the two samples are significant at the 5% level. Other variables such as audit quality, changes in senior management, audit firm size and firm size are not significantly different between the two groups, suggesting that failed firms had weak fundamentals.¹²

Table 1 shows that the sample covers five major sectors: properties (25), consumer products (10), industrial products (22), plantation and mining (6), and trading and services (17). Our industry groups represent 31.25% (properties and construction), 12.5% (consumer products), 27.5% (industrial products), 7.5% (plantations and mining),

¹¹ It is impossible to assess the effect of any survivorship bias in the sample because the failed firms cannot be matched to the debt renegotiating sample or the control group on industry, nor on performance.

¹² DeAngelo et al. (1994) and Peltier-Rivest (1999) define distressed firms as firms that experience a decline in dividend, and have at least three consecutive years of negative earnings. Using these criteria would reduce the control sample to less than 10 firms.

and 21.25% (trading and services) of their industry groups in the total population at the time.

We select a control sample from firms listed on Bursa Malaysia. Our control group is matched on unrefined measures of financial performance and industry. Investigation into the performance of the debt renegotiating firms reveals that these firms experience two years of negative earnings prior to default. Hence, the control firms also have at least two consecutive years of negative earnings. The control firms have not failed in debt repayment and have not renegotiated their debts during the test period but are matched based on time, which is the renegotiation year for the test sample. Since prior research indicates that firm performance has a systematic relationship with accruals (Dechow, Sloan, & Sweeney, 1995), we focus on the financial performance measures of control firms, such as earnings and operating cash flows. We acknowledge that our samples are not exactly pair-matched, but we select these firms from the same industry depending on the availability of data on the Bursa Malaysia. The 59 control firms constitute the population of firms that meet the criteria set earlier. The final sample of firms for our study thus consists of 139 firms from 5 industries.

5. Results

5.1. Analysis of discretionary accruals

In Table 2 we investigate debt renegotiating firms' DAC behaviour three years prior to and one year following their renegotiations. For all models, DAC are positive in the third and second years preceding negative in the year immediately prior to debt renegotiation. The mean DAC of debt restructuring firms are -0.189 , -0.181 , -0.123 and -0.119 for models 1, 2, 3 and 4 respectively during year 0 (negotiation period), and all are significantly negative ($p < 0.01$), consistent with Jaggi and Lee (2002). The negative DAC in the year prior to debt renegotiation might be interpreted by lenders or investors as the reversal of positive accruals (see Rosner, 2003, for the reversal of accruals in bankrupt firms) or due to firms' poor performance. The same trend is observed in year 1 (post renegotiation), with

Table 2

Mean discretionary accruals in CDRG-assisted and other debt restructured firms ('debt renegotiating' firms) from year -3 through $+1$ (0 is the year of debt renegotiations)

$t = \text{TA} / \text{TA}_{i,t-1} = [\alpha_0 + \alpha_1(\Delta \text{RFV}_{i,t-1}) + \alpha_2(\text{PPE}_{i,t-1})]$	(Model 1)				
$t = \text{TA} / \text{TA}_{i,t-1} = [\alpha_0 + \alpha_1(\Delta \text{REV}_{i,t-1}) + \alpha_2(\Delta \text{REC}_{i,t-1}) + \alpha_3(\text{PPE}_{i,t-1})]$	(Model 2)				
$t = \text{WCF} / \text{WCF}_{i,t-1} = [\alpha_0 + \alpha_1(\Delta \text{RFV}_{i,t-1})]$	(Model 3)				
$t = \text{WCF} / \text{WCF}_{i,t-1} = [\alpha_0 + \alpha_1(\Delta \text{REV}_{i,t-1}) + \alpha_2(\Delta \text{REC}_{i,t-1})]$	(Model 4)				
Discretionary accrual models	-3	-2	-1	0	+1
	$n = 80$	$n = 80$	$n = 80$	$n = 80$	$N = 80$
t_{it} Model 1	0.020	0.063	-0.135	-0.189	-0.045
t_{it} Model 2	0.031	0.078	-0.138	-0.181	-0.041
t_{it} Model 3	0.049	0.091	-0.042	-0.123	-0.012
t_{it} Model 4	0.061	0.101	0.046	-0.119	-0.013

negative DAC across all the four models, but the magnitude is much lower compared with that of the renegotiation year.

5.2. Descriptive statistics and correlations

Table 3 presents descriptive statistics for both the debt renegotiating and control firms' dependent and independent variables. DAC1 is estimated based on the total accruals Jones

Table 3
Descriptive statistics of the variables^a

Variables	Mean	Median	Standard deviation	25%	75%
<i>Panel A (debt renegotiating firms, 80 observations)</i>					
MVE	0.627	0.838	2.042	0.338	1.602
BE	0.143	0.626	2.360	0.087	0.946
OCF	0.161	0.107	0.891	-0.153	0.452
NDAC_1	-0.091	-0.088	0.179	-0.045	0.001
NDAC_2	-0.065	-0.071	0.399	-0.027	0.017
NDAC_3	-0.048	-0.054	0.346	-0.019	0.001
NDAC_4	-0.039	-0.055	0.257	-0.010	0.011
DAC_1	-0.189	-0.134	0.223	-0.281	-0.011
DAC_2	-0.181	-0.153	0.225	0.347	-0.022
DAC_3	-0.123	-0.056	0.125	-0.168	-0.010
DAC_4	-0.119	-0.060	0.263	-0.206	-0.111
AuditQ	0.200	0.000	0.403	0.000	1.000
ChgMgt	0.288	0.000	0.455	0.000	1.000
Lev	0.950	0.922	1.169	0.768	1.433
Big-5	0.650	0.000	0.479	0.000	1.000
ROI	-0.183	-0.115	0.194	-0.262	0.033
Mowner	0.168	0.147	0.173	0.003	0.271
YrDum	0.550	1.000	0.501	0.000	1.000
EBT _{t-1}	-0.119	-0.099	0.304	-0.099	-0.019
EBT _{t+2}	-0.058	-0.067	0.211	-0.067	-0.021
<i>Panel B (control sample: 118 observations)</i>					
MVE	1.937	0.936	2.685	0.936	2.127
BE	0.139	0.813	3.685	0.957	1.047
OCF	0.482	0.117	1.841	0.118	0.353
NDAC_1	0.021	0.013	0.109	0.042	0.069
NDAC_2	0.032	0.016	0.115	-0.042	0.071
NDAC_3	-0.059	-0.048	0.115	-0.132	0.014
NDAC_4	-0.049	-0.046	0.108	-0.119	0.023
DAC_1	-0.130	-0.103	0.173	-0.215	-0.033
DAC_2	-0.137	-0.103	0.188	-0.249	-0.034
DAC_3	-0.065	-0.039	0.105	-0.100	-0.001
DAC_4	-0.071	-0.043	0.110	-0.103	-0.001
AuditQ	0.068	0.000	0.253	0.000	1.000
ChgMgt	0.238	0.000	0.423	0.000	1.000
Lev	0.723	0.697	3.530	0.568	0.827
Big-5	0.717	1.000	0.451	0.000	1.000
ROI	0.125	-0.065	0.682	-0.160	0.012

(continued on next page)

Table 3 (continued)

Variables	Mean	Median	Standard deviation	25%	75%
<i>Panel B: control sample (118 observations)</i>					
Mowner	0.140	0.064	0.177	0.001	0.216
YrDum	0.500	1.00	0.502	0.000	1.000
EBT	-0.033	-0.030	0.077	-0.071	0.015
EBT _{t+2}	-0.054	-0.021	0.015	-0.021	0.019

N = 118 firms

MV_t is the market value of equity three months after the fiscal year end, BVE is book value of equity, OCF denotes operating cash flows. These are scaled by book value of equity at the beginning of the year. NDAC is non-discretionary accruals, and DAC is discretionary accruals. Variable with suffix ₋₁ is measured based on the total accruals cross-sectional Jones model, ₋₂ is measured based on the total accruals cross-sectional modified Jones model, ₋₃ is measured based on the working capital cross-sectional Jones model and ₋₄ is measured based on the working capital cross-sectional modified Jones model. AuditQ is a dummy variable that takes the value of 1 if the firm receives qualified opinion during the year, otherwise 0. ChgMgt is a dummy variable that takes the value of 1 if a new executive or managing director is appointed in the renegotiation year, otherwise 0. Lev is total debt-to-total assets ratio, Big 5 is a dummy variable that takes the value of 1 if the firm is audited by a big-5 audit firm, otherwise 0. ROI is return on total assets, measured by operating profits before taxes divided by lagged total assets. Mowner is the percentage ownership held by senior executives of the firm, YrDum is a dummy variable to control for year effects where 1999 is 1 and 1998 is 0, and EBT_{t-1} and EBT_{t-2} are earnings before taxes and extraordinary items one year and two year ahead respectively, both variables scaled by one-year lagged total assets.

model, DAC2 is based on the total accruals modified Jones model, DAC3 is based on the working capital Jones model and DAC4 is based on the working capital modified Jones model. All models use cross-section estimation.

The estimated discretionary accruals derived from the four cross-sectional models depict high skewness and kurtosis (not tabulated). Non-normality in the residuals is not unexpected because the sample is drawn from distressed poorly performing firms.¹⁴

The table shows that there are consistencies across the four non-discretionary accruals measures. The mean NDAC1 (Original Jones) is 0.091 while the mean NDAC2 (Modified Jones) is -0.065. The NDAC3 and NDAC4 mean values are -0.048 and -0.039 respectively. The median values are also all negative. The four discretionary accruals mean (and median) values are all negative as stated earlier. The mean BVE is 0.143 with a standard deviation of 2.360. The mean of OCF is 0.161 with a standard deviation of 0.891.

For the control sample, the means for DAC1 and DAC2 are 0.130 and -0.137 respectively, and are less negative for DAC3 and DAC4 (-0.065 and -0.071 respectively). The difference between the renegotiation and control groups is significant (*t*-statistics are 1.962, 2.137, 2.434 and 2.581 for the four models). The magnitude of the mean DAC1 and DAC2 across the samples (ranging from -0.189 to -0.130) is similar to that

¹⁴ We find several significant outliers by plotting the residuals and we winsorize the DAC to the point equivalent to the top and bottom 1% level of the ranked residuals (Kothari, Laguerre, & Leone, 2002). We also winsorize BVE and OCF used in the regression model. Winsorizing does not eliminate outliers, but it limits their influence.

obtained by Johl et al. (2007), who report an average DAC between -0.144 and -0.187 in Malaysia using the modified Jones model.¹⁴

The significant difference in working capital discretionary accruals between the renegotiating and non-renegotiating suggest that renegotiating firms may, on average, have used non-current asset accruals such as depreciation or asset write-downs to reduce earnings relatively more than their counterparts.

To investigate this issue, we examine the annual reports of both the renegotiating and control firms. We note 53 occurrences of intangible asset write-offs out of 80 firms in the debt renegotiation category (66.25%), compared with 58 occurrences out of 117 firm-years (49.57%) in control firms. This difference in the frequency of intangible asset write-offs is significant ($\chi^2 = 5.372$, $p < 0.05$). Fixed asset write-downs occur for 53 of the 80 debt renegotiating firms (66.25%) and 67 of the 117 control firms (57.26%) ($\chi^2 = 3.98$, $p < 0.05$). The mean (median) of intangible assets write-off magnitudes is not significant at the 5% level. However, the magnitude of fixed asset write-offs as a percentage of lagged total assets is significantly higher in debt renegotiating firms (mean = 0.010, median = 0.002) compared to control firms (mean = 0.004, median = 0.001) in year 0 ($t = 1.989$, $p < 0.05$).

The mean MVE and OCF of control sample are 1.937 and 0.482 respectively, which are higher than those of the renegotiating firms. However, the mean BVE is 0.139, which is slightly lower than that of the renegotiating firms. Non-discretionary accruals of Models 1 and 2 are less negative for the control firms, while Models 3 and 4 non-discretionary accruals are more negative. This is consistent with the role of non-current asset write-offs. Total accruals (NDAC + DAC) for the debt renegotiating group are more negative for each model than for the control sample, and the absolute values of the accruals are greater for the renegotiating firms, as expected.

Total accruals for the debt renegotiating sample range from 16% to 28% of lagged total assets. This is approximately double the range for the control group. The fact that we observe persistently large negative accruals surrounding the negotiation periods raises questions about the reasonableness of the magnitude of earnings management. DeAngelo et al. (1994) suggest that such large abnormal accruals may be related to sample firms' ongoing difficulties.¹⁵ It is also possible that the magnitude of negative discretionary accruals has been accentuated due to the reversal of some past income increasing discretionary accruals in the years prior to debt defaults.

Since our sample consists of distressed and poorly performing firms during an economic downturn, we estimate all models by including operating cash flows to mitigate the concern that firm performance is correlated with DAC (Kasznik, 1999). We find no material difference from results presented in Table 2.¹⁶

The descriptive statistics presented in Table 3 show that 20% of debt renegotiating firms received going concern audit qualifications and about 29% had changes in senior management. The mean leverage, measured by the ratio of total debt to total assets, is 0.9, and 63% of the firms were audited by one of the Big-5 accounting firms. The mean ROA

¹⁴ Johl et al. (2007) use a sample of 596 healthy firm-year observations and poorly performing firm-year observations during 1994–1999.

¹⁵ DeAngelo et al. (1994) report abnormal accruals of about 15% of lagged shareholders' equity during the year of dividend reduction by 76 distressed firms. Note that our DAC are expressed as a ratio of lagged total assets.

¹⁶ Detailed results are available from the authors.

is -18.25% and the median value is -11.53% , with a standard deviation of 0.194. About 7% of the control sample received audit going concern qualifications, about 24% had changes in senior management and 72% were audited by Big-5 accounting firms. The mean (median) leverage is 0.723 (0.697) which is lower and the mean (median) ROI of -12.5%

Table 4

Relations between market value of equity and components of earnings^a

	Model 1	Model 2	Model 3	Model 4
<i>Panel A Debt renegotiating firms (n = 80)</i>				
Intercept	1.399** (3.110)	1.456** (3.015)	1.323** (3.560)	0.930** (2.976)
BVE ^c	0.251* (2.262)	0.269* (1.985)	0.315* (2.454)	0.255* (2.663)
OCF ^c	0.253* (2.059)	0.289* (1.999)	0.459* (3.058)	0.540* (2.608)
NDAC ^b	-0.394 (-0.925)	-0.321 (-1.024)	-0.214 (-0.844)	-0.684 (-1.604)
DAC ^b	-0.559* (-2.319)	-0.601* (-2.132)	-0.799* (-2.317)	-0.739* (-1.996)
YrDum	0.360 (0.868)	0.432 (1.037)	0.263 (0.640)	0.412 (1.013)
Adj-R ²	21.6%	19.5%	23.3%	21.9%
Model sig	0.000	0.001	0.000	0.000
F-value	5.350	4.829	5.800	5.431
Highest VIF	1.042	1.312	1.131	1.504
<i>Panel B Control firms in 1167</i>				
Intercept	1.140** (2.876)	1.128** (2.938)	1.122** (2.802)	1.106** (2.761)
BVE ^c	0.175** (5.594)	0.177** (5.523)	0.177** (5.704)	0.176 (5.664)
OCF ^b	0.528** (4.619)	0.517** (4.534)	0.506** (4.441)	0.508** (4.432)
NDAC ^b	-1.110 (-0.520)	1.303 (0.372)	1.224 (0.623)	1.161 (0.535)
DAC ^b	-0.943 (-0.309)	-0.213 (-0.401)	-0.767 (-0.766)	-0.656 (-0.748)
YrDum	0.343 (0.734)	0.483 (1.027)	0.561 (1.202)	0.552 (1.190)
Adj-R ²	31.5%	31.6%	32.1%	31.9%
Model sig	0.000	0.000	0.000	0.000
F-value	11.649	11.743	11.957	11.934
Highest VIF	3.347	3.427	1.139	1.417

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{it} + \alpha_2 OCF_{it} + \alpha_3 NDAC_{it} + \alpha_4 DAC_{it} + YrDum + e_{it}$$

MVE_{it} is measured as the market value of equity divided by the prior period's book value of equity. Figures in parentheses are *t*-statistics except as otherwise stated. *, ** Denotes significant at 0.05 and 0.01 based on two-tailed test.

OCF denotes operating cash flows, NDAC is non-discretionary accruals and DAC is discretionary accruals. OCF and BVE are deflated by prior year's book value of equity to mitigate heteroscedasticity problem (Easton, 1998). YrDum is a dummy variable to control for the year effect where 1999 is 1 and 1998 is 0. NDAC and DAC variables in Models 1 to 4 are measured according to total accruals cross-sectional Jones model, total accruals cross-sectional modified Jones model, working capital cross-sectional Jones model and working capital cross-sectional modified Jones model respectively.

(−6.5%) is higher than that of the renegotiating firms. Managerial ownership is slightly lower at 14% compared with debt renegotiating firms (16.8%). In summary, the debt renegotiating firms received more qualified audit opinion, have higher LEV, used more non-big-5 auditors, have lower ROI and have higher managerial ownership.

The correlation structure among the independent variables for the debt renegotiating firms (not tabled) suggests that cash flows (OCF) are positively associated with the book value of equity (BVE) ($\rho=0.22$). As expected, all DACs and NDACs are significantly associated with each other but correlations between DACs and NDACs included in the same regression are only significant for Model 2 ($\rho=-0.484$) and Model 4 ($\rho=-0.404$).

The only high correlation coefficients for the debt renegotiating firms is 0.431 ($p=0.000$) between AuditQ and ROI, suggesting the less profitable firms received more qualified audit opinions within the debt renegotiating firms. Overall, the levels of correlation are not significant enough to cause multicollinearity as is evident from computed Variance Inflation Factors (VIF, Neter, Wasserman, & Kunter, 1983).

5.3. Regression results

Table 4 reports the regressions of MVE on the components of earnings, book value of equity and operating cash flows without the control variables. The *t*-statistics are based on White's (1980) heteroscedasticity-consistent covariance matrix.

Panel A shows that discretionary accruals of debt renegotiating firms are negatively associated with MVE in each of the four models. The coefficients on DAC1, DAC2, DAC3 and DAC4 are −0.559, −0.601, −0.779 and −0.739, respectively, all being significant at the 5% confidence level. In contrast, non-discretionary accruals are not associated with equity market values. Further, to test whether the components of earnings have incremental explanatory power in addition to the book value of equity, a stepwise procedure was used. The results show that OCF and DAC have increased the model's explanatory power significantly, which is consistent with our results presented earlier. Similarly, the coefficient on OCF is significant in all of the four models, suggesting that market participants value operating cash flows positively. With the highest VIF statistic being 1.504 (model 4), there is no evidence of significant multicollinearity. The four models are all significant ($p<0.01$), with the adjusted R^2 ranging between 19.5% and 23.3%.

For our control sample, we find that the market value of equity is significantly associated with OCF, more so than for the renegotiation sample. As hypothesized, we do not find any significant association between the market value of equity and discretionary accruals. Similarly, the NDAC coefficient is not statistically significant in any model. The results in Panel B suggest that the market ignores accruals, both discretionary and non-discretionary, in the valuation of firms that are in financial trouble but have not violated debt covenants.

Obtaining significant negative relationship between equity market value and the discretionary accruals for the debt renegotiating firms, but not for the non-debt renegotiating firms supports hypotheses one and two.

Table 5 (Panel A) reports the debt renegotiating firm regressions results with control variables included. The DAC coefficients are negative ($p<0.05$) in Models 1–4, and are not materially different from those reported in Table 4. Among the control variables, managerial ownership (Mowner) is significant ($p<0.05$) in three of the four models. This is consistent with the McConnell and Servaes (1995) argument that the association between performance and

Table 5

Relations between market value of equity and components of earnings after controlling for other factors^a

	Model 1	Model 2	Model 3	Model 4
	(t-stat.)	(t-stat.)	(t-stat.)	(t-stat.)
<i>Panel A: Debt renegotiating firms (n = 80)</i>				
Intercept	0.454*	0.376*	0.994	0.739*
	(2.201)	(1.958)	(1.724)	(2.381)
BVE ^b	0.235*	0.233*	0.261*	0.264*
	(2.231)	(2.199)	(2.547)	(2.531)
OCF ^b	1.028**	1.057**	1.136**	1.136**
	(4.091)	(4.085)	(4.515)	(4.571)
NDAC ^b	0.206	-0.167	0.191	0.164
	(0.844)	(-0.342)	(1.238)	(1.257)
DAC ^b	-0.542*	-0.655*	-0.846*	-0.434*
	(-1.980)	(-1.968)	(-1.996)	(-2.010)
AuditQ	0.826	0.858	0.747	0.765
	(1.435)	(1.468)	(1.292)	(1.329)
ChgMgt	0.188	0.208	0.182	0.235
	(0.377)	(0.415)	(0.370)	(0.468)
Lev	0.664	-0.735	-0.636	-0.609
	(-1.377)	(-1.469)	(-1.310)	(-1.234)
Big-5	0.458	0.477	0.303	0.322
	(1.039)	(1.056)	(0.683)	(0.719)
ROI	1.313	0.642	-0.053	-0.356
	(1.649)	(1.329)	(0.721)	(0.610)
Mowner	1.357	1.129*	1.580*	1.446*
	(1.949)	(1.959)	(2.078)	(2.078)
YrDum	0.323	0.458	0.256	0.434
	(0.762)	(1.078)	(0.595)	(1.018)
Adj-R ²	23.7%	21.5%	23.2%	22.3%
Model sig	0.002	0.003	0.002	0.004
F-value	3.514	2.850	3.754	3.129
Highest VIF	3.376	3.607	2.802	2.698
<i>Panel B: Control firms (n = 116)</i>				
Intercept	1.427*	1.301*	1.329*	1.226
	(2.524)	(2.481)	(2.434)	(2.395)
BVE ^b	0.177**	0.177**	0.178**	0.176**
	(5.705)	(5.632)	(5.716)	(5.635)
OCF	0.452**	0.439**	0.443**	0.443**
	(3.611)	(3.568)	(3.614)	(3.602)
NDAC ^b	0.402	-0.410	-0.181	-0.275
	(-0.244)	(-0.209)	(-0.601)	(-0.304)
DAC	-1.012	-1.122	-1.062	-1.065
	(-0.413)	(-0.474)	(-0.686)	(-0.781)
AuditQ	-0.236	-0.272	-0.245	-0.265
	(-0.282)	(-0.326)	(-0.289)	(-0.317)
ChgMgt	-0.196	-0.176	-0.202	-0.187
	(-0.385)	(-0.348)	(-0.405)	(-0.381)
Lev	1.086	1.056	1.062	1.017
	(1.319)	(1.309)	(1.062)	(1.236)

Table 5 (continued)

	Model 1	Model 2	Model 3	Model 4
	(<i>t</i> -stat.)	(<i>t</i> -stat.)	(<i>t</i> -stat.)	(<i>t</i> -stat.)
<i>Panel B: Control firms (n = 116)</i>				
Big-5	-0.182 (-0.425)	-0.119 (-0.220)	-0.123 (-0.228)	-0.112 (-0.280)
ROI	0.930* (2.124)	1.003* (2.266)	0.908* (1.989)	0.988* (2.083)
Mowner	1.061 (1.298)	1.587 (1.285)	1.406 (1.203)	1.489 (1.206)
YrDum	0.281 (0.591)	0.379 (0.789)	0.382 (0.795)	0.379 (0.794)
Adj- <i>R</i> ²	34.1%	34.5%	34.4%	34.9%
Model sig	0.000	0.000	0.000	0.000
<i>F</i> -value	6.009	6.087	6.072	6.792
Highest VIF	4.270	4.868	3.051	3.368

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{it} + \alpha_2 OCF_{it} + \alpha_3 NDAC_{it} + \alpha_4 DAC_{it} + \alpha_5 AuditQ + \alpha_6 ChgMgt + \alpha_7 Lev + \alpha_8 Big-5 + \alpha_9 ROI + \alpha_{10} Mowner + YrDum + e_{it}$$

^{1a} Figures in parentheses are *t*-statistics based on White Heteroscedasticity Consistent Standard Errors and Covariance except otherwise stated. *, **Denotes significant at 0.05 and 0.01 based on 2-tailed test. *BVE_{it}* is the book value of equity, *OCF_{it}* denotes operating cash flows, *NDAC_{it}* is non-discretionary accruals, and *DAC_{it}* is discretionary accruals estimated using four established accrual models explained below. *OCF* and *BVE* are deflated by prior year's book value of equity to mitigate heteroscedasticity problem (Easton, 1998). *AuditQ* is a dummy variable that will takes the value of 1 if the firm receives an audit qualification during the year. *ChgMgt* refers to a change in executive or managing director, will takes the value of 1 if a new executive or managing director is appointed in the renegotiation year; *Lev* is total debt-to-total assets ratio; and *Big-5* is a dummy variable that takes a value of 1 if the firm is audited by a big-5 audit firm, 0 otherwise. *ROI* is return on total assets, measured by operating profits before taxes divided by lagged total assets, *Mowner* is the percentage ownership held by senior executives of the firm, and *YrDum* is a dummy variable to control for year effect where 1999 is 1 and 1998 is 0.

managerial equity ownership is more significant in poorly performing firms. It is also consistent with investors perceiving that managers remaining in firms that renegotiate debt during a period of severe economic downturn will act in the interests of investors. Investors are likely to hold this view because managers have demonstrated loyalty by remaining with the organization.¹⁷

However, as managerial ownership increases the incentive for alignment with shareholders at the expense of debtholders also increases. To test whether managers of the distressed firms reduce earnings more via discretionary accruals to extract benefits during renegotiation with a view to increase shareholders' wealth, we incorporate an interaction variable between discretionary accruals and managerial ownership (*DAC* * *Mowner*) and re-estimate the models in Eq. (1). As expected, *DAC* * *Mowner* coefficients are all negative but only two of these are significant ($p < 0.05$).

For our control sample (non-renegotiating firms), results are similar (Table 5, Panel B) to those reported in Table 4 (Panel B). *DAC* is insignificant in any model and *OCF* and *BVE* are highly significant in all models ($p < 0.01$). *ROI* is only significant (positive) suggesting

¹⁷ Another interpretation is that investors perceive that managers of their defaulting firms have been unable to secure better employment, and are beholden to investors for future income, and thus are likely to act in investors' interests.

Table 6

Relations between market value of equity and components of earnings after controlling for other factors^aSample: Debt renegotiating firms and control firms combined ($n=196$)

	Model 1	Model 2	Model 3	Model 4
	(<i>t</i> -stat.)	(<i>t</i> -stat.)	(<i>t</i> -stat.)	(<i>t</i> -stat.)
Intercept	1.191* (2.086)	1.194* (2.082)	1.217* (2.044)	1.183* (2.008)
BVE ^b	0.347** (5.033)	0.353** (5.018)	0.354** (5.130)	0.353** (5.074)
OCF ^b	0.291** (3.309)	0.294** (3.338)	0.286** (3.279)	0.285** (3.270)
NDAC ^b	0.845 (0.413)	0.476 (0.989)	0.694 (0.813)	0.937 (0.848)
DAC ^b	-0.760 (-1.806)	-0.822 (-0.419)	-1.167 (-0.949)	-1.991 (-0.751)
AuditQ	0.272 (0.512)	0.281 (0.531)	0.305 (0.577)	0.296 (0.577)
ChgMgt	-0.176 (-0.444)	-0.182 (-0.465)	-0.189 (-0.485)	-0.175 (-0.448)
Lev	-0.087 (-0.190)	-0.072 (0.119)	-0.144 (-0.321)	-0.136 (-0.339)
Big-5	-0.123 (-0.340)	-0.117 (-0.320)	-0.093 (-0.259)	-0.087 (-0.241)
ROI	0.259* (1.956)	0.220 (1.624)	0.147 (1.413)	0.162 (1.775)
Mowner	0.300* (1.988)	0.332* (2.185)	0.456 (1.476)	0.450* (2.005)
YrDum	0.501 (1.461)	0.543 (1.568)	0.582 (1.683)	0.604 (1.733)
Nego	-1.040* (-2.305)	-1.049* (-2.347)	-1.149** (-2.708)	-1.177* (2.545)
Nego*DAC	-1.198* (-1.955)	-0.617* (2.210)	-0.198 (1.895)	-0.365 (1.780)
Adj- <i>R</i> ²	26.4%	26.8%	26.4%	29.1%
Model sig	0.000	0.000	0.000	0.000
<i>F</i> value	6.046	6.587	6.229	7.092
Highest VIF	5.449	6.868	2.678	4.570

^a Figures in parentheses are *t* statistics based on White Heteroscedasticity Consistent Standard Errors and Covariance except where otherwise stated. *, **Denotes significant at 0.05 and 0.01 based on two-tailed test. BVE_{*it*} is the book value of equity, OCF_{*it*} denotes operating cash flows, NDAC_{*it*} is non-discretionary accruals, and DAC_{*it*} is discretionary accruals estimated using four established accrual models explained below. OCF and BVE are deflated by prior year's book value of equity to mitigate heteroscedasticity problem (Easton, 1998). AuditQ is a dummy variable that takes the value of 1 if the firm receives an audit qualification during the year; ChgMgt refers to a change in executive or managing director, will takes the value of 1 if a new executive or managing director is appointed in the renegotiation year; Lev is total debt-to-total assets ratio, and Big 5 is a dummy variable that takes a value of 1 if the firm is audited by a big-5 audit firm, 0 otherwise; ROI is return on total assets, measured by operating profits before taxes divided by lagged total assets; Mowner is the percentage ownership held by senior executives of the firm; YrDum is a dummy variable to control for the year effect where 1999 is 1 and 1998 is 0, and Nego*DAC is the interaction term between DAC and Nego.

that profitability becomes a more important factor for poorly performing firms not undertaking debt negotiation. However, managerial ownership is not significant.

5.4. Additional tests

The value relevance literature is not specific as to which deflator should be used to reduce possible heteroscedasticity in the residuals. Easton (1998) suggests the use of owners' equity book value at the beginning of the period and Barth et al. (1998b) advocate number of outstanding ordinary shares as deflator. Further, Easton, Sommers, Akbar, and Stark (2003) suggest "management has discretion over the number of shares outstanding", and can decrease or increase this number without corresponding change in the economic characteristics of the firm (such as splitting shares without affecting cash flows). Firms that have large values for price per share, book value per share and earnings per share can unduly influence the estimated regression coefficients. To assess the robustness of our results due to the use of alternative deflators, we estimate the model on a per share basis suggested by Barth et al. (1998a,b). We find that the coefficients on OCF, BVE and DACs are significant at below 5% and the adjusted R^2 is reduced slightly to 17%. However, we note that the distribution of the variables is highly skewed and the coefficients on DACs are high with associated large standard errors compared with models that used lagged book value of equity as deflator. Further, since there are few negative book value of equity, we also deflate the variables by lagged total assets and find that results do not change materially. Thus we conclude that our results are robust with respect to the use of deflator.¹⁸

Our debt renegotiating firms consist of two groups: one group undertook renegotiation with the CDRC support and the other group renegotiated with the lenders directly. We repeated the estimation by including a dummy variable (1 = CDRC and 0 otherwise) in the regression models. The four discretionary accruals coefficients are negative ($p < 0.05$) and the dummy variable is insignificant, suggesting no change in the above noted results.¹⁹

The findings, in general, indicate that the market perceives the discretionary accruals in distressed firms as being attempts to (1) transfer wealth from lenders or government to investors; or (2) otherwise distort the true performance, position or prospects of the firm. Both interpretations support hypothesis 1 (Table 6).

6. Discretionary accruals and future performance

Consistent with Subramanyam (1996) and Gul, Leong and Srinidhi (2000), we test our third hypothesis concerning whether future earnings are associated with the current period discretionary accruals of our financially distressed firms. In our tests, we regress one-year and two-year ahead operating incomes before taxation and regress them, separately for both the renegotiating and control samples in the following model

$$EBT_{t+k} = \alpha + \beta_1 BVE_{it} + \beta_2 OCF_{it} + \beta_3 NDAC_{it} + \beta_4 DAC_{it} + \varepsilon_{it} \quad (7)$$

$k = 1, 2$

¹⁸ Full results can be obtained upon request.

¹⁹ Additional robustness tests were carried out but are not reported in this draft.

Table 7

Relation between discretionary accruals and future earnings

	Model 1	Model 2	Model 3	Model 4
	(t-stat.)	(t-stat.)	(t-stat.)	(t-stat.)
Panel A: Debt renegotiating firms ($n=80$); $EBT_{t+1} = \alpha + \beta_1 BVE_{it} + \beta_2 OCF_{it} + \beta_3 NDAC_{it} + \beta_4 DAC_{it} + \varepsilon_i$				
<i>Panel A: EBT_{t+1} (dependent variable one-year ahead earnings before taxes & extraordinary items, 80 firms)</i>				
Intercept	-0.160** (-4.360)	-0.117** (-3.108)	-0.162** (-3.758)	-0.300** (-3.880)
BVE ^b	0.164* (2.052)	0.105 (1.304)	0.122 (1.563)	0.119 (1.434)
OCF ^b	0.198 (1.736)	0.146 (1.267)	0.129 (0.914)	0.119 (0.633)
NDAC ^b	-0.336 (-0.946)	0.222 (0.574)	0.392 (0.675)	0.333 (-0.575)
DAC ^b	-0.46 (-0.360)	0.132 (0.883)	0.125 (0.583)	0.112 (0.486)
Highest VIF	3.083	3.575	2.592	4.346
Adj-R ²	6.5%	6.3%	6.1%	5.8%
<i>Panel B: debt renegotiating firms (n=80); $EBT_{t+1} = \alpha + \beta_1 BVE_{it} + \beta_2 OCF_{it} + \beta_3 NDAC_{it} + \beta_4 DAC_{it} + \varepsilon_i$</i>				
Intercept	-0.084* (-2.160)	-0.079* (-2.212)	-0.040 (-1.157)	-0.038 (-1.013)
BVE ^b	0.002 (0.638)	0.008 (0.846)	-0.079 (-1.043)	-0.075 (-0.990)
OCF ^b	-0.157 (-0.871)	-0.158 (-0.880)	-0.119 (0.606)	0.110 (0.575)
NDAC ^b	-0.310 (-0.834)	-0.310 (-0.904)	0.106 (0.171)	0.237 (0.396)
DAC ^b	-0.030 (0.223)	-0.050 (0.360)	0.350 (1.527)	0.342 (1.430)
Highest VIF	3.083	3.575	3.609	4.346
Adj-R ²	1.8%	1.9%	1.7%	2.4%
<i>Panel C: Control firms (n=118); $EBT_{t+1} = \alpha + \beta_1 BVE_{it} + \beta_2 OCF_{it} + \beta_3 NDAC_{it} + \beta_4 DAC_{it} + \varepsilon_i$</i>				
<i>k=1,2</i>				
Intercept	-0.039** (-4.873)	-0.037** (-4.783)	-0.039** (-4.345)	-0.040** (-4.512)
BVE ^b	0.010* (2.152)	0.010* (2.149)	0.010* (2.256)	0.010* (2.319)
OCF ^b	0.182* (2.651)	0.203* (2.975)	0.153* (2.366)	0.157* (2.414)
NDAC ^b	-0.023 (-0.308)	-0.088 (-1.193)	0.034 (0.555)	0.019 (0.084)
DAC ^b	0.050* (2.640)	0.046* (2.652)	0.055* (2.336)	0.055* (2.386)
Highest VIF	2.249	1.973	1.532	1.554
Adj-R ²	8.4%	10.6%	8.0%	8.4%
<i>Panel D: Control firms (n=118); $EBT_{t+1} = \alpha + \beta_1 BVE_{it} + \beta_2 OCF_{it} + \beta_3 NDAC_{it} + \beta_4 DAC_{it} + \varepsilon_i$</i>				
Intercept	-0.067** (-4.623)	-0.063** (-4.418)	-0.057** (-3.394)	-0.062** (3.698)

Table 7 (continued)

	Model 1	Model 2	Model 3	Model 4
	(<i>t</i> -stat.)	(<i>t</i> -stat.)	(<i>t</i> -stat.)	(<i>t</i> -stat.)
<i>Panel D Control firms (n = 118): $EBT_{i,t+1} = \alpha + \beta_1 BVE_{i,t} + \beta_2 OCF_{i,t} + \beta_3 NDAC_{i,t} + \beta_4 DAC_{i,t} + \varepsilon_i$</i>				
BVE ^b	0.029** (3.504)	0.030** (3.644)	0.030** (3.480)	0.031** (3.511)
OCF ^b	0.255* (1.960)	0.272* (2.089)	0.105 (0.831)	0.107 (0.840)
NDAC ^b	−0.317* (−2.292)	−0.342* (−2.522)	0.192 (1.659)	0.131 (1.039)
DAC ^b	0.041 (1.178)	0.050 (1.562)	0.071* (2.307)	0.071* (2.268)
Highest VIF	2.256	1.986	1.549	1.570
Adj- <i>R</i> ²	14.6%	15.8%	9.4%	8.2%

*, **Denotes significant at 0.05 and 0.01 based on two-tailed test. $EBT_{i,t+1}$ and $EBT_{i,t+2}$ are earnings before taxes and extraordinary items one-year and two-year ahead respectively. $BVE_{i,t}$ is the book value of equity, $OCF_{i,t}$ denotes operating cash flows, $NDAC_{i,t}$ is non-discretionary accruals, and $DAC_{i,t}$ is discretionary accruals estimated using four established accrual models explained below. All variables are deflated by one year lagged total assets.

Where

EBT = operating earnings before taxes. Other variables have been defined earlier.

The descriptive statistics reported in Table 2 show that for the debt renegotiating firms the mean and median earnings are negative one and two years after debt negotiation. The regression results reported in Table 7 demonstrate that discretionary accruals are not generally associated with earnings either one year or two years ahead. This implies that either (a) economic benefits arose from negative discretionary accruals (e.g., due to lender concessions), or (b) managers' use of discretionary accruals distorted the firm's future earnings prospects regardless of whether or not concessions were obtained. Coefficients on BVE and OCF are not generally significant, suggesting that the current earnings and book values are not good predictors of future performance in the economic circumstances facing the renegotiating and control firms. It is also likely that extreme financial distress resulted in distorting cash flow pattern.

The relatively better average performance of the non-renegotiating control firms is not surprising since they did not default on loan repayment. However, on average, earnings are also negative both one-year and two-years ahead. The regression results reported under Panels C and D of Table 7 show that the coefficient on BVE and OCF are significant in most regressions of one and two years ahead. The coefficient on DAC is significant in all four models at the conventional 5% level in one year ahead, and in Models 3 and 4 for two-years into the future. This suggests that discretionary accruals of non-renegotiating firms are predictive of earnings than is the case for renegotiating firms.

7. Summary and conclusions

In this study, we use a unique Malaysian context to examine how the market prices discretionary accruals of two types of firms; (1) financially distressed firms that renegotiated debt, and (2) financially distressed Malaysian firms that did not renegotiate their debt

contracts during a severe economic downturn. Based upon prior studies such as Subramanyam (1996) and Gul et al. (2000), we argue that discretionary accruals would be negatively associated with equity returns if the market perceives the (negative) discretionary accruals as either (a) an attempt to transfer wealth from the government or lenders to investors; or (b) an opportunity to take a “bath” to clear the decks for future emergence from their financial distress as managers work towards that goal. That is, negative DAC would be associated with positive equity values. Alternatively, if investors perceive that managers use discretionary accruals to signal private information about the firm’s production investment potential, we expect that negative discretionary accruals to be associated with lower market value of equity. Using four established methods of estimating discretionary accruals, we find negative associations between discretionary accruals and equity value for the debt renegotiating sample. The results do not change after controlling for audit qualifications, changes in senior management, leverage, audit firm Big-5 designation, return on investment, or managerial ownership in our regression models.

Our results for the debt renegotiating firms support the view that investors either (a) value managers’ attempts to transfer wealth from governments or lenders to shareholders during financial distress; or (b) expect that managers will use the economic adverse conditions to distort firms’ earnings. The contemporaneous regression results do not support the signalling explanation for discretionary accruals during the year of renegotiation as the market appears to expect turn around by these firms. The fact that discretionary accruals and earnings (two years after the renegotiation period) are not correlated in the regressions indicates that either interpretation is plausible.

For our control sample (financially distressed firms that did not renegotiate debt contracts), we find no evidence of an association between equity market value and discretionary accruals. Rather, we find that market participants place weight on the book value of equity and operating cash flows.

The conclusions noted above are subject to several limitations. First, we note that both debt renegotiating and non-renegotiating firms exhibit large negative discretionary accruals during economic recession. The discretionary accruals reported in our study maybe subject to estimation error and might have been inflated due to using of abnormal estimation model that are developed for normal economic setting. Second, according to Young (1999), established models for estimating discretionary accruals contain significant measurement error due to misspecification of the accounting proxies, despite controlling for known potential sources of such error such as operating cash flows. Finally, there are omitted variables, as is evident from low values of adjusted R^2 and the Ramsey test for omitted variables.

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Do auditing standards improve the accounting disclosure and information environment of public companies? Evidence from the emerging markets in China

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Abstract

In this paper, we investigate the impact of the implementation of a set of new auditing standards in 1996 on the information environment in the emerging markets in China. Because the implementation of such standards can increase the quality and or quantity of accounting disclosures, it can be conceptualized as an improvement in the information environment of public companies. We investigate the improvement in accounting disclosure and information environment from both the market perspective and the accounting perspective. First, consistent with the information economics literature (e.g., [Holthausen, R., & Verrecchia, R., (1990). The effect of informedness and consensus on price and volume behavior. *The Accounting Review*, 65, 191–208]), we find that companies experience a significant increase in trading volume and price volatility subsequent to the implementation of the standards. Second, consistent with the literature on earnings management (e.g., [Chen, C. W. K., & Yuan, H. Q., (2004). Earnings management and capital resource allocation: evidence from China's accounting-based regulation of right issue. *The Accounting Review*, 79, 645–665; Jian, M., & Wong, T. J., (2004). Earnings management and tunneling through related party transactions: evidence from Chinese corporate groups. Working Paper, Nanyang Technological University and Hong Kong University of Science and Technology]), we find a decrease in earnings management and, hence, an increase in quality of earnings. Finally, we find a decrease in the synchronicity of stock prices and, hence, an increase in the quality of firm-specific

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information available to investors, which is consistent with the literature on price synchronicity (e.g., [Morek, R., Yeung, B., & Yu, W., (2000) The information content of stock markets: why do emerging markets have synchronous stock price movements? *Journal of Financial Economics*, 58, 215–260]). Our results have significant implications for standard setters, regulators, researchers, managers, and investors in general and those in the emerging markets in particular.

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Keywords Accounting disclosure; Auditing; Information precision; Trading volume; Price volatility; Earnings management; Price synchronicity; Emerging market

1. Introduction

Issues related to audit quality continue to be of major interest to accounting researchers, practitioners, and policy makers. For instance, the Enron scandal has led U.S. policy makers to confront issues related to improvement in audit quality. Meanwhile, the International Federation of Accountants (IFAC) commissioned the Task Force on Rebuilding Public Confidence in Financial Reporting (Credibility Task Force) in October 2002 to look at ways of restoring the credibility of financial reporting. Given the continuing consideration of stricter auditing standards from an international perspective, the question of whether higher quality auditing standards have potential economic consequences is important. To shed light on the economic consequences of the implementation of new auditing standards, we investigate the Chinese emerging market where a set of auditing standards was introduced in a situation where, previously, no auditing standards existed with the exception of a few guidelines from the sponsoring governmental agencies.

The literature indicates that increased accounting disclosure improves the information environment of listed companies (e.g., Leuz & Verrecchia, 2000; Greenstein & Sami, 1994). However, there is little empirical evidence on the relationship between auditing standards and the information environment of listed companies.¹ Based on the information economics literature (e.g., Holthausen & Verrecchia, 1990), we investigate the role of auditing standards in increasing disclosure and improving the information environment through its informedness and consensus effects in an emerging market.² Furthermore, based on the earnings-management literature in China (e.g., Chen & Yuan, 2004; Jian & Wong, 2004), we propose that implementing new auditing standards will result in a decrease in earnings management and, hence, an increase in the

In information system literature, the information environment can be defined as the aggregate of individuals, institutions, or systems that collect, accumulate, process, disseminate, or use information. We use this general meaning throughout the present paper. The information environment of public companies consists of public companies and their information users such as investors, creditors, policy makers, and regulators also included is information itself, in particular, public disclosure.

Throughout this paper we use the term “increased accounting disclosure” or “increased disclosure” to mean increased quality and/or quantity of accounting disclosures due to the implementation of the new auditing standards. Leuz and Verrecchia (2000) used a similar term. They defined “increased levels of disclosure” as “either an increase in the quantity of disclosure or an increase in the quality of disclosure (or both)” (footnote 1, p. 9). Although auditing standards might affect the quality of accounting disclosure more directly than the quantity of disclosure, requirements of new auditing standards might motivate auditors to ask their clients to disclose necessary information when clients fail to do so. Therefore, in this paper, we assume these two effects are present simultaneously and do not try to isolate them.

quality of earnings. Finally, consistent with the price-synchronicity literature (e.g., Moreck, Yeung, & Yu, 2000), we hypothesize a decrease in the synchronicity of stock prices, hence, an increase in the quality of firm-specific information available to investors.

So far, few studies in accounting literature have directly investigated whether auditing standards enhance the disclosure quality and or quantity and hence improve the information environment of listed companies. One reason might be that a relatively rich disclosure environment – a feature of the samples of U.S. companies used in most accounting-disclosure studies – obscures the effect of a company's commitment to increased disclosure (Verrecchia, 2001). Another reason might be that new auditing standards in a developed market are intended to modify or clarify issues rising from previous standards, which makes its impact on the market too subtle to detect. However, in an emerging market, a direct study on the impact of the implementation of new auditing standards (thereby, a change in the auditor regulatory environment) on the information environment is subject to these limitations to a much lesser degree. Auditing standards are implemented to "protect the legitimate rights of investors and other interested parties" and to "safeguard the public interests of the society" (The Ministry of Finance, 1995, Preface to Independent Auditing Standards, PIAS, Ch. 1, Section 2). In addition, in the information environment of an emerging market such as China, where the accounting disclosure was criticized for its low quality and quantity, the economic consequences of increased accounting disclosures due to the implementation of a set of auditing standards should be significant.

Auditors in China were required for the first time to follow a series of new standards. These covered a variety of topics ranging from the general auditing standard to the specific standards on audit of financial statements, engagement letters, planning, sampling, evidence, working papers, and audit reports. In particular, they were required to issue a qualified opinion for any GAAP violation, scope restriction and inconsistent GAAP application and an unqualified opinion with an explanatory paragraph when necessary (Gul, Sun, & Tsui, 2003). In addition, to enforce the new auditing standards, auditors are subject to stricter disciplinary rules and stricter monitoring and sanctions by the Chinese Institute of Certified Public Accountants (CICPA) and the Chinese Securities Regulatory Commission (CSRC) (Gul et al., 2003; DeFond, Wong, & Li, 2000).³ Consequently, because the Chinese market went from virtually no auditing regulation to significant regulations, it provides an ideal setting for observing the incremental impact of increased audit quality on the information environment. Not surprisingly, DeFond et al. (2000) find a significant increase in the frequency of qualified audit opinions subsequent to the implementation of new auditing standards in China and Haw, Park, Qi and Wu (2003) that qualified audit opinions have a significant effect on the timing of the annual report of Chinese public companies.

³ The change in auditing practice should be classified as from "little auditing" to "plenty of auditing" rather than "no auditing" to "auditing" whereas the change in auditing standards should be classified as from "no auditing standards" to "have auditing standards." The auditing practice resumed in the 1980s as a result of privatization of state-owned enterprises and the separation of government from enterprises. However, the major providers of auditing services were state-owned auditing bureaus performing the required government audits of state-owned enterprises before the emergence of a demand for independent auditing services due to public offerings in the 1990s. The guidance was mostly the regulatory documents issued by the government before the evolution of auditing standards. Please see our discussion in the following section and Gul et al. (2007) for further discussion on auditing practice in China.

To investigate the impact on information precision (environment), we conduct a cross-sectional study to investigate whether Chinese companies experienced any increase in trading volume and price volatility after controlling for the level of free float, firm's systematic risk, firm value, and inclusion in a market index. The results of both ordinary least squares and two-stage least squares regressions show that the trading volume and price volatility increased subsequent to the implementation of the new set of auditing standards, which is consistent with our hypotheses.

In an investigation of the impact of the implementation of auditing standards on earnings quality, we find a significant decrease in earnings management, which implies an improvement in earnings quality. Finally, we find a significant decrease in the synchronicity of stock prices in the market subsequent to the implementation of auditing standards, indicating that there is an improvement in the quality of firm-specific information available to investors.

Our paper contributes to the literature in several ways. First, it provides support for regulators' assertions that higher quality, accounting and auditing standards, improve market liquidity and benefit investors by providing enhanced comparability of financial information about investment choices (Cox, 2006; Levitt, 1998). Second, the empirical results support Lev's (1988) contention that one of the social benefits of increased accounting disclosures is a thicker market with improved liquidity. Third, our paper is among the few (Hagigi, Kluger, & Shields, 1993; Swaminathan, 1991) that address the relationship between disclosure, trading volume, and price volatility within the context of informedness and consensus suggested by Holthausen and Verrecchia (1990).⁴ Finally, to the best of our knowledge, our paper is the first to systematically examine the impact of new auditing standards on the information environment, including information precision, earnings quality, and the quality of firm-specific information for Chinese public companies.

The results have significant implications for standard setters and regulators in general and those in emerging markets in particular. In investigating the impact of mandatory auditing standards on the stock market, this paper provides evidence on the economic consequences of accounting regulation. Regulators usually state that high quality accounting and auditing standards "result in greater investor confidence, which improves liquidity, reduces capital cost, and makes market prices possible" (Levitt, 1998, 81). While these notions are not easy to document in rich disclosure settings because the commitment to increased levels of disclosure in such settings is incremental (Verrecchia, 2001), the emerging-market environment provides an ideal setting to detect the incremental effects because such changes in accounting and auditing regulations are of a "revolutionary" nature. In addition, the findings of the study have implications for the decision making of managers and investors. Our results indicate that managers are less likely to manage earnings when the auditor starts to apply auditing standards to their auditing procedures and investors can obtain a higher quality of assurance service from auditors when unprecedented auditing standards take effect. Finally, our findings have theoretical implications for the literature by showing first-hand evidence that in emerging

⁴ In Holthausen and Verrecchia (1990), the informedness effect reflects the extent to which investors become more knowledgeable about firm value at the time of information release, suggesting an increase in both volume and price volatility, while the consensus effect reflects the extent of agreement among investors at the time of information release, suggesting a decrease in volume and an increase in price volatility. Please see more detailed discussions in the literature review section.

markets the implementation of new auditing standards could increase both trading volume and price volatility, suggesting a dominating informedness effect rather than a dominating consensus effect.

The rest of this paper is organized as follows. Section 2 describes the institutional settings of the emerging Chinese market leading to the motivation for our study. We review prior research and develop our hypotheses in Section 3. Section 4 discusses the research design and Section 5 presents the empirical results. The final section concludes the paper.

2. Institutional background of Chinese stock markets and disclosure practice

The Chinese stock markets – Shanghai Stock Exchange and Shenzhen Stock Exchange – are characterized as emerging markets. The rapid development of the Chinese securities exchanges, which were established in the early 1990s, stimulated the regulation of disclosure practices. To standardize disclosure, two important documents were issued – The Accounting System for Companies with Listed Shares (1992) and The Accounting Standard for Enterprises – General Standards (ASFE 1992), which represented the first step in bringing Chinese accounting in line with international accounting disclosure practice (Sami and Zhou, 2004).⁵ However, these regulations were no detailed guidelines for disclosures.⁶

During the period 1949–1980, there was no independent auditing practice in the former planned economy, because all enterprises were owned and managed by the state and accounting practice simply focused on reporting compliance with state economic plans, using a set of accounts especially structured on the sources and uses of funds (Graham, 1996). Resulting from decentralization of state-owned enterprises and separation of government from enterprises, auditing practice resumed in the early 1980s as an institutional outcome flowing from the transformed economy (Xiang, 1998). However, before the 1990s, the major providers of auditing services were state-owned auditing firms or auditing bureaus (Gul, Sami, & Zhou, 2007), performing required government audits of state-owned enterprises. The CPAs provided independent auditing services only to companies with foreign investment, which were only a handful of companies.

With the emergence of public companies, auditing firms expanded their services to the realm of independent auditing. To improve the audit quality in this area, the sponsor of auditing firms, the State Administration of Audit (SAA), issued a series of regulations on independent auditing

⁵ These accounting policies introduced the accounting concepts from western countries, such as assets, liabilities, and stockholders' equities, to the domestic companies and information users for the first time. Unlike many previously issued regulatory accounting rules that focused on the source and distribution of funds (every enterprise was treated as a unit of the government), these policies adopted the framework of international accounting standards. However, there were some differences. For instance, Chinese GAAP has more restrictive accounting policies on bad debt, depreciation, inventory, and investment. For details, please also see Sami and Zhou (2004) and Xiang (1998).

⁶ In 1992, the local governments of Shanghai and Shenzhen issued regulations on accounting disclosure of listed companies, including regulations on the content of accounting disclosures such as footnotes to financial statements and management discussions and analyses. However, there were no uniform, detailed regulations at the country level before 1995. Although CSRC issued several temporary guidelines on the format and content of public disclosure of public companies in 1994, these could not improve the disclosure because these regulations were too basic to provide any detailed guidance and there were no accounting standards to guide public companies to prepare reliable and sufficient information (Lin and Su, 1998).

services (Gul et al., 2007). The SAA also sponsored the Chinese Association of Certified Public Auditors (CACPA, 1992–1995), which provided certificate programs to auditors employed in auditing firms. In the meantime, the Chinese Institute of Certified Public Accountants (CICPA, 1988–present), sponsored by the Ministry of Finance (MOF), regulated public accounting firms and their members.⁷ In 1995, the CICPA and CACPA merged and this brought auditing and accounting firms under the umbrella of the regulations of the CICPA, and the Certified Public Accountants (CPA) program emerged as the only certificate program available to independent accountants.⁸ The reform of regulatory bodies, however, could not mitigate the negative effects of government affiliation at the level of CPA firms, since the CPA firms were still associated with sponsoring government agencies or state-owned institutions (Gul et al., 2007). Consequently, the disclosure behavior of companies did not received sufficient and effective control during this period, and was widely criticized.⁹

Moreover, auditors played the role of government agents and bore little responsibility for any improper behavior (Xiang, 1998). Because it was common practice to have a company audited by an auditing firm affiliated with the same level of government, auditors bent the rules under pressure from local government officials and company managers to pursue their own interests (Xiang, 1998; Graham, 1996). Additionally, there was no litigation against auditors (Graham, 1996; DeFond et al., 2000; Gul et al., 2003). Thus, auditors usually were affiliated with their clients and lacked motivation to be independent from them.

In response to the criticisms, following other regulations,¹⁰ the first set of auditing standards was issued in 1995 (see summary in Table 1). These auditing standards included the General Independent Auditing Standards and Specific Independent Auditing Standards on the audit of financial statements, engagement letters, planning, sampling, evidence, working papers, and audit reports.

During the period of implementing new auditing standards, government regulators strengthened their enforcement of auditing regulations and demonstrated their abilities and willingness to impose penalties on errant auditors. For example, the Chinese High Court issued Document no. 56 in 1996 emphasizing auditor's legal liabilities at the national level (Gul et al., 2003). In addition, the CSRC issued a series of enforcement letters to warn and or penalize companies and their auditors who made material misstatements, such as the Shandong Bohai affair, the Sichuan Electronic affair, and the Qiongmngyuan scandal – all in 1996 (Lin and Su, 1998). The Qiongmngyuan scandal was of particular note; it resulted in the CPA firm being suspended from practice for six months. Given this background, an important empirical issue is

Although competition contributed to the rapid growth of both auditing and accounting firms, the inconsistency in auditing regulation resulted in variations in the quality of audits. Clients suffered from repeated audits by different auditors sponsored by different government agencies, such as the audit bureau, taxation authority, finance department, and state banks. For details, please refer to Graham (1996).

Hereafter, the CPA firms are used to refer to both accounting and auditing firms.

During this period, there were a series of scandals in which managers issued fraudulent financial statements to mislead investors on purpose, such as the Yuanye scandal in 1991, the Wangfujing scandal in 1993, the Jianfeng scandal in 1993, and the Nantong Machine Tool event in 1995 (Lin and Su, 1998).

For instance, the first nationwide uniform-accounting-disclosure regulation, the Bylaws of Information Disclosure for Publicly Traded Companies issued in 1993, by the Chinese Securities Regulation Commission, hereafter (CSRC) and the Content and Format of Annual Reports (issued in 1994 and revised in 1997, by the CSRC) were issued. The Act of People's Republic of China on CPAs (1993) and the Act of Listed Companies (1993) provided more legal regulations for auditing practice.

Table 1
The first batch of auditing standards in the Chinese emerging market

Title	Date of issuance	Effective date
Preface to independent auditing standards	12-25-95	01-01-96
General independent auditing standard	12-25-95	01-01-96
Specific independent auditing standard No.1-audit of financial statements	12-25-95	01-01-96
Specific independent auditing standard No.2-audit engagement letters	12-25-95	01-01-96
Specific independent auditing standard No.3-audit planning	12-25-95	01-01-96
Specific independent auditing standard No.4-audit sampling	12-25-95	01-01-96
Specific independent auditing standard No.5-audit evidence	12-25-95	01-01-96
Specific independent auditing standard No.6-audit working papers	12-25-95	01-01-96
Specific independent auditing standard No.7-audit reports	12-25-95	01-01-96
Independent auditing practice pronouncement No.1-verification of capital contributions	12-25-95	01-01-96

Source: www.china-cpa.com (as of September 30, 2004)

whether the implementation of auditing standards affected the information environment of the market.

Several studies have investigated accounting and auditing issues in the Chinese market. For instance, DeFond et al. (2000) investigate the impact of new auditing standards on audit opinions and audit-market concentration. By comparing the periods before and after the implementation of new standards, they find that the frequency of qualified audit opinions was higher subsequent to the issuance of the new auditing standards. Using a sample of listed Chinese firms from 1995–1999, Haw et al. (2003) observe that both audit opinions and earnings surprises have significant effects on the timeliness of annual-earnings announcements after controlling for firm size, the presence of losses, financial distress, auditor switches, and the implementation of CRSC's decree on timing of annual disclosure in 1997. They also find a significant interaction effect between audit opinions and earnings surprises (i.e., positive earnings surprises with modified audit opinions are announced significantly later than unqualified negative earnings surprises).

Sami and Zhou (2004) investigate the difference in the value relevance of accounting information prepared under Chinese domestic GAAP for A-share investors and under the international accounting standards (IAS) for B-share investors.¹¹ Their results show that accounting information is relevant in the pricing of both A-shares and B-shares. Using companies issuing both A- and B-shares, they find that the B-shares' accounting

¹¹ In addition to shares issued to domestic investors (called A-shares), companies were allowed to issue shares to foreign investors (called B-shares) through the two national exchanges or through other exchanges (such as H-shares traded on the Hong Kong Stock Exchange). Both A and B (or H) shares convey equal rights to the same company, although, they are different in terms of ownership. However, A-share investors receive accounting information prepared under Chinese GAAP and mostly audited by local CPA firms, while B-share (or H-share) investors receive accounting information prepared under IAS (or Hong Kong GAAP) and mostly audited by international accounting firms. In this study, we focus on the impact of auditing regulations on the information environment of public companies. Therefore, we only examine the A-shares where there are direct impacts from the new auditing standards in China.

information is more value relevant than the A-shares'.¹² Zhou (2007) uses bid-ask spreads to investigate the impact of increased disclosure on information asymmetry. Using a simultaneous equation approach, she finds that Chinese companies experienced a significant reduction in bid-ask spread subsequent to the implementation of new auditing standards. In addition, after controlling for the concurrent effects of trading volume and price volatility, her time-series intervention analyses show that the reductions in the bid-ask spreads were significant and permanent. Therefore, Zhou (2007) concludes that the implementation of new auditing standards helps reduce information asymmetry in an emerging market.

To the best of our knowledge, no empirical study has investigated the impact of new auditing standards on the information precision manifested in trading volume and price volatility, earnings quality (level of earnings management), or the quality of firm-specific information. To investigate these issues, in this paper, we examine: (1) whether the implementation of new auditing standards is associated with increases in the precision of financial information available to investors; (2) whether the new standards put more pressure on auditors to curtail the earnings-management behavior of their clients; and (3) whether the new auditor regulation is associated with higher quality of firm-specific information available to investors.

3. Literature review and hypotheses development

The literature on information economies has documented various aspects of information content in public announcements. Holthausen and Verrecchia (1990) analyze two aspects of information content: the informedness effect and the consensus effect, which are also referred to as the effects of information precision in Swaminathan (1991).¹³ The informedness effect reflects the extent to which investors become more knowledgeable about firm value at the time of information release, suggesting an increase in both volume and price volatility. This happens because as investors become more knowledgeable and attempt to update their portfolios, investors' demand changes, which in turn, drives up trading volume and price variability. The consensus effect reflects the extent of agreement among investors at the time of information release, suggesting a decrease in volume and an increase in price volatility. This occurs because trading volume declines when investors interpret information releases homogeneously and

Some studies investigated this type of market from a different perspective. For instance, Kinnunen, Niskanen and Kasanen (2000) use a sample from the Helsinki Stock Exchange to analyze the information content of dual disclosures of IAS (International Accounting Standards) and LAS (Local Accounting Standards) earnings. Using market adjusted stock returns measured from the 50-week period ending in the week of financial statements release, they find that restating local GAAP earnings according to the IAS helps to meet foreign investors' information needs, but is of limited use to domestic investors.

In addition to these effects, Lev (1988) argues that increased accounting disclosure has an impact on information asymmetry, another aspect of information content in a public announcement. The effect on information asymmetry is similar to the informedness effect and reflects the amount of knowledge a specific investor (or a group of investors) has compared to that of another investor (or another group of investors) (Ameen and Guffey, 1994). Similar to the informedness effect, the information asymmetry effect implies an increase in volume and price volatility at the time of information release. The literature has documented the economic link between increased accounting disclosure and reduced information asymmetry using bid-ask spread as a major proxy for information asymmetry (e.g., Greenstein and Sami, 1994; Healy et al., 1999; Leuz and Verrecchia, 2000; Zhou, 2007). Our paper extends this line of research by investigating the impact of increased accounting disclosure on the information precision with a focus on the effects on informedness and consensus.

because investors' residual errors are more correlated and less uncertainty is resolved through the market aggregation process.¹⁴

In general, information release can both inform investors (informedness) and reduce the diversity of their opinions (consensus). When the informedness effect dominates, both the trading volume and price volatility increase; when the consensus effect dominates, the trading volume decreases but the price volatility increases. The accounting literature indicates that accounting numbers are interpreted heterogeneously, causing an increase in trading volume (Bamber, 1987) and also reinforcing the effect of informedness on price volatility (Swaminathan, 1991). However, an increase in consensus coupled with an increase in informedness has a countervailing effect. For instance, the consensus effect was found to dominate the informedness effect when information on auditor switches was announced (Hagigi et al., 1993).

For increased accounting disclosure due to new auditing standards in the emerging Chinese markets, the informedness effect is expected to dominate the consensus effect. First, the informedness effects of the increased disclosure requirement may involve volume and price volatility because trading volume and price volatility reflect the changes in investors' beliefs to a certain degree (Holthausen and Verrecchia, 1990). These effects could be much more significant in the emerging Chinese markets because of the lower disclosure levels compared to the U.S. markets. Thus, to the extent that regulation through auditing standards should provide higher assured-quality information and/or make more previously undisclosed information available to the public, the level of informedness of the investors in the market should permanently increase.

Second, the issuance of an audit opinion may also convey information to the market because it might confirm prior expectations of the market, implying a consensus effect. That is, the market may become aware of pending lawsuits, affiliated party transactions, problems with suppliers, credit problems, or other economic conditions prior to the announcement of the audit opinion (Ameen and Guffey, 1994). The audit opinion provides the market with an independent assurance of the economic transactions and events disclosed in financial statements of public companies. Therefore, the announcement of the audit opinion could increase the consensus among investors. This consensus effect could be small, however, for the following reasons: investors may not be familiar with the content of the audit reports since the new standards are regulating the types of auditors opinions for the first time; and investors may not be able to expect a type of auditor opinion for a particular company because of the tightened regulation on the auditing industry. We therefore, expect the informedness effect of the increased disclosure to be larger than the consensus effect. That is, we expect an increase in both the trading volume and price volatility, hence the following two hypotheses.

¹⁴ Holthausen and Verrecchia (1990) examine the effects of information precision on price variability and divergence of beliefs. In their model, each agent in the market is assumed to receive a public information signal that has a noise term common to all agents and an idiosyncratic term unique to each agent. Using a Walrasian market model, they show that a decrease in the idiosyncratic noise term (i.e., increase in consensus) increases price variability and decreases divergence of beliefs.

Hypothesis 1. (in alternative form): Trading volume increases subsequent to the implementation of new auditing standards.

Hypothesis 2. (in alternative form): Price volatility increases subsequent to the implementation of new auditing standards.

Our next hypothesis investigates whether the implementation of auditing standards make auditors act more independently in deterring earnings management behavior by managers, hence, improving earnings quality. Goldman and Barlev (1974) discuss the importance of auditor independence in providing audit assurance service on public information issued by firms to their shareholders. They argue that auditors are typically involved in three types of conflicts of interest: (1) auditor-client firm conflict of interest, (2) investor-management conflict of interest and (3) self-interest-professional standards conflict of interest. Accounting and auditing standards help to improve auditor independence by reducing all three types of conflicts of interests. Davis, Soo and Trompeter (2006) provide empirical evidence in support of the inverse relationship between earnings management and auditor independence. Managers tend to engage in aggressive reporting of accruals that inflate earnings. Therefore, companies with higher accruals face higher agency costs than companies with lower accruals (Krishnan, 2003). Auditors play an important role in mitigating these agency costs by deterring the opportunistic management of earnings. Under the new auditing standards, auditors are more likely to negotiate with management when aggressive earnings management exists and, hence, are more likely to deter or reveal earnings management behavior by managers. DeFond et al. (2000) find that the implementation of new standards results in a higher frequency of nonstandard audit opinions. Based on these discussions, we hypothesize that:

Hypothesis 3. (in alternative form): Earnings quality (management) increases (decreases) subsequent to the implementation of new auditing standards.

Finally, we investigate whether the quality of firm-specific information improved following the implementation of new standards. Roll (1988) provides evidence on the inverse relationship between price synchronicity and the amount of company-level relative to market-level information that is impounded in stock prices. Morck et al. (2000) find that stock prices move together more (are more synchronous) in emerging economies than in developed economies. In other words, if the market has a poor information environment and investors are more oriented toward short-term trading gains or speculations, investors are more likely to be sensitive to political events and rumors. As a result, they are more likely to follow the market and be more susceptible to insider trading. This suggests a positive relationship between the protection level for public investors and the extent to which firm-specific information is impounded in stock prices, hence an inverse relationship between increased protection and the price-synchronicity level.

Watts and Zimmerman (1986) describe an audit as a monitoring device to protect shareholders. Subsequent to the implementation of new standards, auditors should have better tools for deterring and revealing any earnings misreporting, which should help them provide better quality service for the public interest and better protection for the property

rights of investors. Consequently, the price synchronicity level should be reduced. Thus, in this study, we also test the following hypothesis:

Hypothesis 4. (in alternative form): Price synchronicity decreases subsequent to the implementation of new auditing standards.

4. Research design

In this paper, we examine the impact of the first set of auditing standards, which took effect on January 1, 1996, in China. Correspondingly, the annual reports of fiscal year 1995 were the first group of reports to be audited under these specific auditing standards. The sample selection started with the entire population of companies issuing A-shares (including those that issue both A and B-shares) that are listed on either the Shanghai Stock Exchange or Shenzhen Stock Exchange as of January 1995. The sample companies were selected on the basis of the following screening criteria: (1) companies issue A-shares (2) daily last-bid price, daily last-ask price and closing-price data, since January 1995, were available from the Taiwan Economic Journal Database (TEJ); (3) annual reports' dates were available from the TEJ database or annual reports; (4) annual reports were available for fiscal years 1994 and 1995; (5) trading volume and the number of publicly held shares were available. This screening procedure resulted in 542 company-period observations (271 companies, 162 companies from the Shanghai Stock Exchange and 109 companies from the Shenzhen Stock Exchange) for our analyses (see Table 2).

4.1. Investigating the impact on the information precision

4.1.1. Trading volume model

According to the literature on trading volume, both the level of informedness and divergence of traders' beliefs affect trading volume (Karpoff, 1987; George, Kaul, & Nimalendran, 1994). Typically, the market comprises rebalancing trades (nonevent-related trading as investors trade the market portfolios of stocks back and forth) and abnormal trades (e.g., informed trading and liquidity trading, for details see Tkac, 1999). The former is related to market-wide information, while the latter is associated with information on

Table 2
Sample selection

Sample selection procedure	Number of companies
Companies that issue A-shares whose stock price data are available since January 1995	287
Less: annual reports' dates are not available from the TEJ database or annual reports	10
Less: companies bid or ask price data are not available from the TEJ database	6
Total number of companies available for analysis	271
Including	
Companies listed on the Shanghai Stock Exchange	162
Companies listed on the Shenzhen Stock Exchange	109

individual companies. Hence, a theoretical function between the disclosure regulation and trading volume is:

$$\begin{aligned}\text{Trading volume} &= \text{rebalancing trades} + \text{abnormal trades} \\ &= f(\text{disclosure regulation, other market-wide information}) \\ &\quad + f(\text{company disclosure, company characteristics, other factors})\end{aligned}$$

The literature shows that company characteristics such as major stakeholders' ownership, company size, and inclusion in a market index contribute to (abnormal) trading volume (Bessembinder, Chan, & Seguin, 1996; Tkac, 1999; Leuz and Verrecchia, 2000). Trading volume is also associated with price volatility (Karpoff, 1987). Accordingly, we examine the following trading volume model for both the long and short windows:

$$\begin{aligned}\text{TURNOVER}_i &= \alpha_0 + \alpha_1 \text{PERIOD} + \alpha_2 \text{MV}_i + \alpha_3 \text{VAR}_i + \alpha_4 \text{NFLOAT}_i \\ &\quad + \alpha_5 \text{INDEX} + e_i\end{aligned}\quad (1)$$

where

TURNOVER average weekly (daily) share turnover in the pre-adoption period or post-adoption period. Share-turnover is defined as the total shares traded divided by the total outstanding shares. For the long window, the pre-adoption (post-adoption) period is defined as 50 weeks before (after) the release of the fiscal year 1995 annual report, which was the first to be audited under the new auditing standards, while for the short window, the pre-adoption (post-adoption) period is defined as seven days around the date of the annual report release for fiscal year 1994 (1995);

PERIOD one if the observation is from post-adoption period and one otherwise;

MV average weekly (daily) market value of company's equity in the pre-adoption period or post-adoption period (in logarithm);

VAR average weekly standard deviation of returns (standard deviation of daily returns) in the pre-adoption period or post-adoption period;¹⁵

NFLOAT percentage of shares held by the top ten shareholders according to the annual report;

INDEX one if the stock is included in the composite share index on the Shenzhen stock exchange or SH180 index on the Shanghai stock exchange and 0 otherwise; and

e =the error term.

We expect a positive sign for VAR and a negative sign for the stakeholders' ownership (NFLOAT), a measure of insider trading and an inverse measure of free float, since earlier research finds that price volatility and the level of free float are both positively related to trading volume (Leuz and Verrecchia, 2000).

¹⁵ For the long window, weekly standard deviation of returns is calculated as the standard deviation of daily returns during each week and then averaged over 50 weeks before/after the release of the 1995 annual report, while for the short window, standard deviation of daily return is based on the daily returns during the seven days around the annual release date in the pre/post-adoption period.

The sign for MV is ambiguous (Tkac, 1999). On the one hand, larger companies experience trading related to market information (versus individual firm-specific information), therefore, they may have a higher trading volume than smaller companies. On the other hand, larger companies have a larger analyst and media following and thus, are subject to more publicity, which reduces the amount of private information that can be profitably traded on (the informed trading), hence, they may have a lower trading volume than smaller companies.

The sign of the coefficient for INDEX could be ambiguous too. Informed trading tends to account for less trading activity of index stocks, which makes index stocks trade closer to or under the expected level (Tkac, 1999). However, the use of market-timing portfolios and portfolio-insurance strategies may cause more trades on these stocks than on others. For example, Bessembinder et al. (1996) find that the trading volume of S&P 500 companies responds more strongly than others to market-wide information, indicating that this may be due to the fact that the S&P 500 companies are used in index-arbitrage trading. Finally, the sign on PERIOD in the trading volume model is expected to be positive (negative) depending upon whether informedness (consensus) dominates.

4.1.2. Price volatility model

The accounting disclosure literature documents the impact of increased accounting disclosure on price volatility (e.g., Healy, Hutton, & Palepu, 1999; Swaminathan, 1991). To explore the relationship between increased disclosure and price volatility, we investigate the determinants of price volatility and its simultaneous variation due to increased disclosure as well. The theoretical model can be derived from the theoretical model of disclosure suggested in Verrecchia (2001), in which the relationship between a mandatory disclosure y and the change in an asset price from time $T-1$ to time T is:

$$P_T - P_{T-1} = \alpha + \beta(y - m) + \gamma\Omega + \xi \quad (2)$$

where α , β , γ are parameters, m is the mean of a company's uncertain value, Ω are variables other than y that are related to firm value, hence, the change in price, and ξ represents variables unrelated to firm value (e.g., noise). If y and Ω are independent, then dividing by P_{T-1} on both sides of the equation gives us:

$$R_T = (P_T - P_{T-1}) / P_{T-1} = \alpha / P_{T-1} + \beta(y - m) / P_{T-1} + \gamma\Omega / P_{T-1} + \xi \quad (3)$$

$$\text{and } \text{Var}(R_T) = \alpha^2 \text{Var}(1/P_{T-1}) + \beta^2 \text{Var}((y - m) / P_{T-1}) + \gamma^2 \text{Var}(\Omega / P_{T-1}) + \text{Var}(\xi) \quad (4)$$

where R_T represents the stock return at time T . To simplify it:

$$\text{Price volatility} = f(\text{disclosure, other factors influencing volatility in share price}).$$

Consistent with the theoretical model, empirical studies indicate that price volatility is associated with disclosure level (Swaminathan, 1991; Leuz and Verrecchia, 2000), which is $\text{Var}((y - m) / P_{T-1})$ in Eq. (4). In addition, empirical studies (e.g., Leuz and Verrecchia, 2000) show

that price volatility is positively associated with major stakeholders' ownership and a company's systematic risk – part of $\text{Var}(\Omega \cdot P_{T-1})$ in Eq. (4), but negatively associated with market value – part of $\text{Var}(1 \cdot P_{T-1})$ in Eq. (4). Accordingly, we estimate the following *price volatility model* for both short and long windows:

$$\text{VAR}_i = \alpha_0 + \alpha_1 \text{PERIOD} + \alpha_2 \text{MV}_i + \alpha_3 \text{NFLOAT}_i + \alpha_4 \text{BETA}_i + e_i \quad (5)$$

where

VAR – average weekly standard deviation of returns (standard deviation of daily returns) in the pre-adoption period or post-adoption period. For the long window, the pre-adoption (post-adoption) period is defined as 50 weeks before (after) release of the fiscal year 1995 annual report, which was the first to be audited under the new auditing standards, while for the short window, the pre-adoption (post-adoption) period is defined as seven days around the date of annual report release for fiscal year 1994 (1995);

PERIOD – one if the observation is from the post-adoption period and zero otherwise;

MV – average weekly (daily) market value of company i 's equity in the pre-adoption period or post-adoption period (in logarithm);

NFLOAT – percentage of shares held by the top 10 shareholders according to the annual report;

BETA – systematic risk of company i , estimated with weekly returns in the pre-adoption period or post-adoption period for the long window, while for the short window it is estimated with weekly returns over 50 weeks before the annual report release; and

e = the error term.

Because price volatility decreases with company size and increases with beta and major stakeholders' ownership (Swaminathan, 1991; Healy et al., 1999; Leuz and Verrecchia, 2000), the sign on MV in the price volatility model is expected to be negative, while those on BETA and NFLOAT are expected to be positive. According to the second hypothesis, we expect the sign on PERIOD in the price volatility model to be positive.

Because Eqs. (1) and (5) might be dependent on one another, we use the simultaneous regression method (i.e., two-stage least squares, 2SLS) to estimate those equations in addition to an ordinary least squares (OLS) estimation. Moreover, both trading volume and price volatility have been used as proxies for information content in the literature (e.g., Swaminathan, 1991; Healy et al., 1999). In particular, Holthausen and Verrecchia (1990) present an economic rationale for examining both price and volume effects showing that informedness and consensus effects affect both the variance of price change and volume. Therefore, examining these factors simultaneously helps to provide more insights into the economic benefits of increased accounting disclosure.

4.2 Investigating the impact on earnings quality

The earnings management literature usually uses discretionary accruals as a measure of earnings management. Commonly, the cross-sectional modified Jones model is used to estimate discretionary accruals (Dechow, Sloan, & Sweeney, 1995; Guay, Kothari, & Watts,

1996). However, Chen and Yuan (2004) argue that the proper earnings management measure in China is noncore earnings (net income minus core operating earnings). First, the tradition of rule-based accounting in China permits limited opportunities for manipulating accruals. Second, the CSRC set a clear benchmark for return on equity (ROE) for stock issues and trading. For instance, publicly listed companies were required to have a minimum of 10% ROE for each of three consecutive years prior to any public offering before 1998 (DeFond et al., 2000; Jian and Wong, 2004). This was later modified to a minimum of 10% average ROE and a minimum of 6% ROE (CSRC Notice No. 12, 1999).¹⁶

Under such circumstances, a typical way to manipulate earnings by Chinese listed companies is noncore operating items. Many studies have provided empirical evidence on earnings management via noncore operating income (see Jian and Wong, 2004; Chen and Yuan, 2004). Regulators also regard non-operating items as potential earnings-management items. For instance, since 1999, the CSRC has been adopting a different method that excludes infrequent items, such as gains and losses from the investment and sales of fixed assets, from the calculation of ROE. Therefore, following the literature on this emerging market, we use noncore operating income (NROE) as a measure of earnings management.¹⁷

We conduct both univariate and multivariate tests in analyzing NROE. The univariate test is used to check whether there is significant difference in the noncore operating income between the pre-adoption and post-adoption periods. The multivariate test, on the other hand, regresses the noncore operating income on the dummy period (indicating post-adoption period) and other financial-health variables identified in the literature (Dopuch, Holthausen, & Leftwich, 1987; DeFond et al., 2000) using the following model:

$$\text{NROE} = c_0 + c_1 \text{PERIOD} + c_2 \text{EX} + c_3 \text{EX} * \text{PERIOD} + c_4 \text{FOREIGN} + c_5 \text{LSIZE} + c_6 \text{DETRAT} + c_7 \text{CURRAT} + e \quad (6)$$

where

NROE=noncore operating income divided by year-end total equity;¹⁸

PERIOD=a dummy variable indicating the effect of new auditing standards, coded as one if the observation is from the post-adoption period (fiscal year 1995) and zero if from the pre-adoption period (fiscal year 1994);

EX=the stock exchange where the share is listed, coded as 1 if listed on Shanghai Stock Exchange and zero if listed on the Shenzhen Stock Exchange;

FOREIGN=a dummy variable for companies also issuing H-shares or B-shares;

LSIZE=the log of the average daily market value of firm's equity over the seven-day window;

DETRAT=total long-term debt divided by total equity at the end of each year;

CURRAT=current debt divided by current assets at the end of each year; and

e=the error term.

¹⁶ This change in benchmark for ROE for stock issues and trading took effect after our sample period and, hence, does not affect our results and conclusions.

¹⁷ Additional tests using the cross-sectional modified Jones Model does not yield any significant results, which is consistent with the justification of the use of noncore operating income by prior research in this market.

¹⁸ We conducted a sensitivity test using the beginning of the year equity. The results were qualitatively the same as those reported.

We estimate this model for the pooled sample of companies. A negative coefficient on the dummy variable for period is consistent with Hypothesis 3. We include foreign ownership (FOREIGN), company size (LSIZE), and debt ratios (DETRAT and CURRAT) as control variables, because the earnings-management literature indicates these factors might affect the motivation of managers in manipulating earnings. We also include a dummy variable to control for stock exchange.

4.3 Investigating the impact on the quality of firm-specific information

A measure of the quality of firm-specific information content perceived by investors is synchronous stock-price movement, which reflects the relative importance of firm-specific information compared to the general market information in the pricing process of stocks. Following Morck et al. (2000), stock-price synchronicity is measured by the R -squares of regression statistics from the following linear regression:

$$R_{it} = a_i + b_i R_{mt} + e_i \quad (7)$$

where R_{it} is stock i 's return in week t , and R_{mt} is a market index return.¹⁹ A high R -square in this regression model indicates a high degree of stock-price synchronicity. We estimate the model for each of the sample companies in the pre-adoption (post-adoption) period based on the 50-week observations prior (subsequent) to the implementation of auditing standards. Then a univariate analysis is performed to test whether there is a lower synchronicity in the period subsequent to the implementation of new standards.

To further examine whether the reduction in synchronicity, if detected, is due to the implementation of auditing standards and not macroeconomics variables, we use a control group of B-shares. The prices of these shares are less likely to be affected by the new auditing standards since companies' reports issued to B-shareholders is prepared under international accounting standards and audited under international auditing standards after which new standards were modeled. While we expect a reduction in the synchronicity level due to the implementation of auditing standards for our experimental group (A-shares), there is no such expectation for the control group (B-shares).

5. Empirical results

5.1. The impact of increased disclosure on information precision

5.1.1. Long window tests

Table 3 presents the descriptive statistics for the variables used in the long window analyses. The descriptive statistics show that, subsequent to the implementation of new

¹⁹ We use the Shenzhen A share index and the Shanghai A share index rather than their overall market index to test the association between individual share returns and market returns. As a sensitivity test, we delete the first 10 companies and find qualitatively similar results as those reported, indicating that our results based on market index return is not affected by the potential impact of large firms.

Table 3
Descriptive statistics of regression variables in trading volume and price volatility models long window

Variables	Sample	Number	Mean	Median	Std. Dev
TURNOVER	All	542	2.931	2.241	2.230
	PERIOD = 0	271	1.351	1.024	1.041
	PERIOD = 1	271	4.511***	4.291***	1.967
VAR	All	542	3.031	3.017	0.712
	PERIOD = 0	271	2.506	2.416	0.458
	PERIOD = 1	271	3.555***	3.502***	0.505
MV	All	542	6.970	6.824	0.807
	PERIOD = 0	271	6.741	6.587	0.749
	PERIOD = 1	271	7.199***	7.126***	0.799
NFLOAT	All	542	0.603	0.614	0.149
	PERIOD = 0	271	0.605	0.622	0.155
	PERIOD = 1	271	0.602	0.609	0.143
BETA	All	542	0.999	0.993	0.210
	PERIOD = 0	271	1.001	1.016	0.232
	PERIOD = 1	271	0.998	1.013	0.188
INDEX	All	542	0.244	0.000	0.430
	PERIOD = 0	271	0.244	0.000	0.430
	PERIOD = 1	271	0.244	0.000	0.430

Definition of Variables: PERIOD = one if the observation is from post-adoption period and zero otherwise. For the long window, the pre-adoption (post-adoption) period is defined as 50 weeks before (after) the release of the fiscal year 1995 annual report, which was the first to be audited under the new auditing standards. MV = average weekly market value of the firm's equity over 50 weeks before and 50 weeks after the annual report release (in logarithm). TURNOVER = average weekly share turnover over 50 weeks before and 50 weeks after the annual report release (share turnover is defined as the trading volume divided by total shares outstanding). VAR = average weekly standard deviation of returns over 50 weeks before and 50 weeks after the annual report release. NFLOAT = the percentage of shares held by top 10 stockholders according to the annual report. INDEX = one if the stock is included in the composite share index on the Shenzhen stock exchange or SH180 index on the Shanghai stock exchange (and zero otherwise). BETA = systematic risk of firm *i*, estimated with weekly returns over 50 weeks before and 50 weeks after the annual report release.

***, **, * significant at 0.01, 0.05, 0.10, respectively.

auditing standards, companies had significantly higher share turnover than in the previous period. The average (median) share turnover (TURNOVER) for the pre-adoption period is 1.351 (1.024), while that for the post-adoption period is 4.511 (4.291). According to the *t*-test (Wilcoxon test) the change in the mean (median) of share turnover is highly significant.

As to price volatility, the descriptive statistics show that, subsequent to the implementation of new standards, the companies had significantly higher price volatility than in the pre-adoption period. The average (median) price volatility (VAR) for the pre-adoption period is 2.506 (2.416), while that for the post-adoption period is 3.555 (3.502). The *t*-test (Wilcoxon test) further indicates that the changes in the mean (median) are significant.

Table 3 also shows that during the sample period, companies experienced a significant increase in their market values (MV). This suggests the importance of controlling for company characteristics such as firm size to isolate changes due to the implementation of the new auditing standards from changes in the individual companies *per se*. Table 3 does not show significant changes for other variables.

Table 4

Pearson correlation coefficients for variables in trading volume and price volatility models: long window

Variables	PERIOD	TURNOVER	VAR	MV	NFLOAT	BETA	INDEX
PERIOD	1.000						
TURNOVER	0.748	1.000					
	0.000						
VAR	0.774	0.901	1.000				
	0.000	0.000					
MV	0.162	0.095	0.071	1.000			
	0.000	0.027	0.099				
NFLOAT	-0.011	-0.021	0.000	0.118	1.000		
	0.808	0.630	0.993	0.006			
BETA	-0.038	-0.079	0.048	-0.014	0.036	1.000	
	0.380	0.065	0.265	0.749	0.402		
INDEX	0.000	-0.039	0.070	0.318	-0.094	-0.026	1.000
	0.999	0.365	0.104	0.000	0.029	0.543	

See definitions in Table 3.

Table 4 reports the Pearson correlation coefficients for the variables used in the long window analyses. PERIOD is highly correlated with VAR, with r equal to .774 and TURNOVER, with r equal to .748. The signs are consistent with the results of the univariate tests reported in Table 3. According to Holthausen and Verrecchia (1990), trading volume and

Table 5

Cross-sectional regression of trading volume and price volatility models: OLS-long window

Variables	Sign	Coefficient	Std. Dev.	<i>t</i> -statistic	<i>p</i> -value
<i>Panel A Trading volume model</i>					
$TURNOVER_i = \alpha_0 + \alpha_1 PERIOD_i + \alpha_2 MV_i + \alpha_3 VAR_i + \alpha_4 NFLOAT_i + \alpha_5 INDEX_i + e_i$					
Constant		-5.308	0.446	-11.91	<.0001
PERIOD	+	0.403***	0.125	3.21	0.0008
VAR	+	2.599***	0.086	30.15	<.0001
MV	+	0.065	0.061	1.05	0.2926
NFLOAT		-0.491**	0.292	-1.68	0.0464
INDEX	?	0.030	0.108	0.27	0.7840
R-square		81.7%		<i>F</i> value	477.45
Adjusted R-square		81.5%		Pr> <i>F</i>	<.0001

Panel B Price volatility model $VAR_i = \alpha_0 + \alpha_1 PERIOD_i + \alpha_2 MV_i + \alpha_3 NFLOAT_i + \alpha_4 BETA_i + e_i$

Constant		1.927	0.199	9.70	<.0001
PERIOD	+	1.063***	0.041	25.78	<.0001
MV		-0.026	0.026	-0.98	0.1633
NFLOAT	+	0.069	0.137	0.50	0.3069
BETA	+	0.712***	0.094	7.59	<.0001
R-square		58.8%		<i>F</i> value	191.89
Adjusted R-square		58.5%		Pr> <i>F</i>	<.0001

See definitions in Table 3.

***, **, * significant at 0.01, 0.05, 0.10, respectively (one-tail for variables with an expected sign and two-tail otherwise).

Table 6
Cross-sectional regression of trading volume and price volatility models 2SLS-long window

Variables	Sign	Coefficient	Std. Dev	t-statistic	p-value
<i>Panel A. Trading volume model</i>					
$\text{TURNOVER}_i = \alpha_0 + \alpha_1 \text{PERIOD} + \alpha_2 \text{MV}_i + \alpha_3 \text{VAR}_i + \alpha_4 \text{NFLOAT}_i + \alpha_5 \text{INDEX}_i + e_i$					
Constant		-1.595	0.945	-1.69	0.0460
PERIOD	?	1.909***	0.365	5.23	<.0001
VAR	+	1.181***	0.334	3.53	0.0002
MV	+	0.026	0.072	0.36	0.7228
NFLOAT	-	-0.331	0.355	-0.93	0.1757
INDEX	+	0.059	0.113	0.53	0.5978
System weighted R-square		44.8%			
<i>Panel B. Price volatility model</i>					
$\text{VAR}_i = \alpha_0 + \alpha_1 \text{PERIOD} + \alpha_2 \text{MV}_i + \alpha_3 \text{NFLOAT}_i + \alpha_4 \text{BETA}_i + e_i$					
Constant		1.927	0.199	9.70	.0001
PERIOD	+	1.063***	0.041	25.78	<.0001
MV		-0.026	0.026	-0.98	0.1633
NFLOAT	+	0.069	0.137	0.50	0.3069
BETA	+	0.712***	0.094	7.59	<.0001
System weighted R-square		44.8%			

See definitions in Table 3.

***, **, * significant at 0.01, 0.05, 0.10, respectively (one-tail for variables with an expected sign and two-tail otherwise).

price volatility are positively correlated when the informedness effect dominates the consensus effect, and are negatively correlated when the consensus effect dominates the informedness effect. As shown in Table 4, VAR and TURNOVER are highly correlated, with r equal to .901. This positive correlation indicates that the increased accounting disclosure has a dominating informedness effect over consensus effect. There is no other correlation coefficient in excess of .318, indicating multicollinearity is not a serious problem.²⁰

Panel A of Table 5 reports the results from the ordinary least squares (OLS) estimation of the trading-volume model for the long window. The model is highly significant and explains about 82% of the variation in share turnover. The dummy variable for the post-event period is significantly positive indicating that the implementation of new auditing standards helps build a thicker market, one of the social benefits of increased accounting disclosure argued in Lev (1988). All other coefficients have the expected signs. The sign on the coefficient for price volatility is consistent with Leuz and Verrecchia (2000). It suggests that price volatility increases with trading volume due to the dominance of the informedness effect.

Panel B of Table 5 reports the OLS estimates of the price volatility model. Also, the model is highly significant and explains about 59% of variation in price volatility. The post-event dummy has a positive and significant coefficient, which is consistent with the second

²⁰ In addition, the Variance Inflation Factor (VIF) values in our regressions are all less than 10, again indicating that multicollinearity is not a serious problem in our study. Also, for all of our multivariate analyses, we conduct a White (Chi-square) test and find no evidence of heteroscedasticity problem.

Table 7

Univariate analysis and cross-sectional regression of trading volume and price volatility models: short window

Panel A. Descriptive statistics of regression variables

Variables	Sample	Number	Mean	Median	Std. Dev.
TURNOVER	All	542	2.682	1.717	2.752
	PERIOD=0	271	1.459	1.037	1.452
	PERIOD=1	271	4.282***	3.585***	3.942
VAR	All	542	3.844	2.810	2.749
	PERIOD=0	271	2.701	2.571	1.163
	PERIOD=1	271	5.239***	4.955***	4.142
MV	All	542	6.744	6.610	0.760
	PERIOD=0	271	6.755	6.571	0.769
	PERIOD=1	271	6.782	6.659	0.750
NFLOAT	All	542	0.603	0.614	0.149
	PERIOD=0	271	0.605	0.622	0.155
	PERIOD=1	271	0.602	0.609	0.143
BETA	All	542	1.005	1.011	0.168
	PERIOD=0	271	1.011	1.016	0.143
	PERIOD=1	271	0.999	1.010	0.189
INDEX	All	542	0.244	0	0.430
	PERIOD=0	271	0.244	0	0.430
	PERIOD=1	271	0.244	0	0.430

Panel B. Correlation matrix

Variables	PERIOD	TURNOVER	VAR	MV	NFLOAT	BETA	INDEX
PERIOD	1.000						
TURNOVER	0.483	1.000					
	0.000						
VAR	0.502	0.775	1.000				
	0.000	0.000					
MV	0.051	-0.029	-0.025	1.000			
	0.237	0.503	0.556				
NFLOAT	-0.016	-0.004	0.032	0.247	1.000		
	0.711	0.920	0.450	0.000			
BETA	-0.019	-0.026	-0.007	-0.046	0.074	1.000	
	0.665	0.541	0.874	0.281	0.085		
INDEX	0.000	-0.066	-0.089	0.362	-0.072	0.043	1.000
	1.000	0.124	0.038	0.000	0.093	0.314	

*Panel C. Multivariate analyses — OLS estimates*Trading volume model: $\text{TURNOVER}_i = \alpha_0 + \alpha_1 \text{PERIOD}_i + \alpha_2 \text{MV}_i + \alpha_3 \text{VAR}_i + \alpha_4 \text{NFLOAT}_i + \alpha_5 \text{INDEX}_i + e_i$

Variables	Sign	Coefficient	Std. Dev	t-statistic	p-value
INTERCEP		1.322	0.906	1.459	0.073
PERIOD	?	1.193***	0.206	5.796	0.000
VAR	+	0.654***	0.031	20.799	0.000
MV	.	0.183	0.142	-1.290	0.196
NFLOAT	-	0.007	0.006	-1.158	0.124
INDEX	-	0.060	0.242	0.248	0.806
R-square	55.51%			F value	133.732
Adjusted R-square	55.09%			Pr > F	0.000

Table 7 (continued)

Panel C. Multivariate analyses — OLS estimates

Price volatility model: $VAR_i = \alpha_0 + \alpha_1 PERIOD_i + \alpha_2 MV_i + \alpha_3 NFLOAT_i + \alpha_4 BETA_i + e_i$

Variables	Sign	Coefficient	Std Dev	t-statistic	p-value
INTERCEP		1.849	1.445	1.280	0.101
PERIOD	+	2.582***	0.262	9.870	0.000
MV	–	–0.147	0.180	–0.819	0.207
NFLOAT	+	0.014*	0.009	1.629	0.052
BETA	+	0.977	0.781	1.252	0.102
R-square	15.74%			F Value	25.075
Adjusted R-square	15.11%			Pr > F	0.000

Panel D. Multivariate analyses — 2SLS estimates

Trading volume model: $TURNOVER_i = \alpha_0 + \alpha_1 PERIOD_i + \alpha_2 MV_i + \alpha_3 VAR_i + \alpha_4 NFLOAT_i + \alpha_5 INDEX_i + e_i$

Variables	Sign	Coefficient	Std. Dev	t-statistic	p-value
INTERCEP		2.553	1.951	1.309	0.096
PERIOD	?	2.799*	2.026	1.382	0.168
VAR	+	0.024	0.788	0.031	0.488
MV	?	–0.148	0.192	–0.768	0.444
NFLOAT	–	–0.001	0.011	–0.110	0.457
INDEX	?	–0.506	0.777	–0.652	0.516
System weighted R-square	15.47%				

Price volatility model: $VAR_i = \alpha_0 + \alpha_1 PERIOD_i + \alpha_2 MV_i + \alpha_3 NFLOAT_i + \alpha_4 BETA_i + e_i$

INTERCEP		1.849	1.445	1.280	0.101
PERIOD	+	2.582***	0.262	9.870	0.000
MV		–0.147	0.180	–0.819	0.207
NFLOAT	+	0.014*	0.009	1.629	0.052
BETA	+	0.977	0.781	1.252	0.102
System weighted R-square	15.47%				

Definition of Variables: PERIOD = one if the observation is from post-adoption period and zero if from pre-adoption period. For the short window, the pre-adoption (post-adoption) period is defined as the seven-day window, from day –3 to day 3 around the release of fiscal year 1995 (fiscal year 1994) annual report. TURNOVER = average daily share turnover over the seven-day (day –3 to day 3) short window around annual release where share turnover is defined as the trading volume divided by total shares outstanding. MV = average daily market value of the firm's equity over the short window (in logarithm). VAR = standard deviation of daily returns over the short window. NFLOAT = the percentage of shares held by top 10 stockholders according to the annual report. INDEX = one if the stock is included in the composite share index on the Shenzhen stock exchange or SH180 index on the Shanghai stock exchange and zero otherwise, and BETA = systematic risk of firm i , estimated with weekly returns over 50 weeks before annual report release.

***, **, * significant at 0.01, 0.05, 0.10, respectively (one-tail for variables with an expected sign and two-tail otherwise).

hypothesis and suggests that accounting disclosures under the new auditing standards convey new information to the market. These results are in line with the findings by Leuz and Verrecchia (2000) and Swaminathan (1991).

To check whether companies with infrequent trading in their stocks are driving the results (Leuz and Verrecchia, 2000), we ran regressions separately for companies with infrequent trading and those with frequent trading, whose share turnovers are larger/smaller

than the overall mean, respectively. The results show that both groups have significant and positive coefficients for the post-event dummy, although, the coefficient is smaller for companies with frequent trading than for companies with infrequent trading. Therefore, our results are consistent with the effects of information precision (informedness effect) as proposed in Hypotheses 1 and 2.

Table 6 reports the results of 2SLS estimation for the long window. The coefficient for the dummy variable indicating the post-event period in the trading volume model (Panel A) remains highly significant even after controlling for the simultaneous effects of increased accounting disclosure on trading volume and price volatility. The coefficient for price volatility is significant and positive, consistent with the OLS results. All other coefficients are insignificant. Panel B of Table 6 reports the estimates of the price-volatility model from the simultaneous equations method, which is similar to panel B of Table 5. Overall, these 2SLS estimates indicate increases in trading volume and price volatility and suggest the dominance of the informedness effect of new standards over the consensus effect, which is consistent with Hypotheses 1 and 2.

5.1.2. Short window tests

Table 7 reports the results of the univariate and multivariate analyses using Eqs. (1) and (5) estimated on a short window. We examine both trading volume and price volatility over a seven-day window around annual report releases for 1994 (pre-adoption period) and 1995 (post-adoption period). Panel A presents the results of univariate tests of the changes in trading volume and price volatility around the annual report releases for both years. The results show that, subsequent to the implementation of the new standards, companies experienced significant increases in the trading volume and price volatility. These results hold for both the mean (*t*-test) and median (Wilcoxon test). The results for other variables are not significant. Panel B of Table 7 shows correlations that are generally consistent with those reported for the long window in Table 4 and point to the dominance of the informedness effect over the consensus effect. Also, the VIF values in our regressions are all less than 10, indicating that multicollinearity is not a serious problem.

The results of multivariate regressions are summarized in Panels C and D of Table 7. Panel C indicates that both trading volume and price volatility increased significantly over the post-adoption window, while controlling for company size, systematic risk, stakeholders' ownership, and index inclusion. Considering the simultaneous effects of disclosure on trading volume and price volatility, we also perform a 2SLS regression. The 2SLS results, presented in Panel D of Table 7, indicate that the increase in trading volume during the post-adoption period, although not significant, is approaching significant even after controlling the simultaneous effects of increased disclosure on trading volume and price volatility. In addition, for the price volatility model, the coefficient of the dummy variable (PF-RIOD) remains highly significant. Overall, these results indicate significant increases in trading volume and price volatility and suggest the dominance of the informedness effect of the new standards over the consensus effect.²¹ These

²¹ One may argue that the change in liquidity trading (nothing to do with information at all) could increase the trading volume. This topic extends the framework of informedness and consensus concepts by Holthausen and Verrecchia (1999). However, Wu and Liu (2006) provide empirical evidence that liquidity trading increases trading volume but decreases price volatility. Therefore, our results are not driven by simple liquidity trading, as both trading volume and price volatility increase over both long and short windows in our study.

Table 8
Univariate and multivariate analyses of the impact of increased disclosure on earnings quality

Panel A. Univariate test

Variable	Mean	Std. Dev.	Std. Error	T-test	Prob. > T
ROE					
PERIOD=0	0.111	0.097	0.007	−0.320	0.7489
PERIOD=1	0.114	0.079	0.005		
COREROE					
PERIOD=0	0.092	0.119	0.008	−1.089	0.2769
PERIOD=1	0.103	0.089	0.005		
NROE					
PERIOD=0	0.031	0.062	0.004	2.007**	0.0456
PERIOD=1	0.021	0.046	0.003		
LSIZE					
PERIOD=0	6.702	0.768	0.046	−1.372*	0.0853
PERIOD=1	6.791	0.751	0.045		
DETRAT					
PERIOD=0	0.050	0.080	0.006	−1.278	0.2021
PERIOD=1	0.059	0.073	0.004		
CURRAT					
PERIOD=0	0.765	0.353	0.025	1.070	0.2852
PERIOD=1	0.730	0.364	0.022		
FOREIGN					
PERIOD=0	0.235	0.425	0.031	0.266	0.7901
PERIOD=1	0.225	0.418	0.025		

Panel B. Multivariate analysis

NROE = $c_0 + c_1 \text{PERIOD} + c_2 \text{EX} + c_3 \text{EX} * \text{PERIOD} + c_4 \text{FOREIGN} + c_5 \text{LSIZE} + c_6 \text{DETRAT} + c_7 \text{CURRAT} + e$					
Variables	Sign	Coefficient	Std. Dev.	t-statistic	p-value
INTERCEP		0.023	0.024	0.973	0.176
PERIOD		−0.016**	0.008	−1.951	0.026
EX		−0.021***	0.008	−2.785	0.006
EX * PERIOD		0.019*	0.011	1.802	0.072
FOREIGN		0.001	0.007	0.132	0.448
LSIZE		0.002	0.004	0.426	0.335
DETRAT	+	−0.033	0.034	−0.973	0.166
CURRAT	+	0.013**	0.007	1.709	0.044
R-square	2.8%	F value			1.760
Adjusted R-square	1.2%	Prob. > F			0.094

Definition of variables: ROE = operating income divided by year-end total equity; COREROE = core operating income divided by year-end total equity; NROE = noncore operating income divided by year-end total equity; PERIOD = a dummy indicating the effect of the implementation of new auditing standards, coded as one if the observation is from the post-adoption period (annual release of fiscal year 1995) and zero if from the pre-adoption period (annual release of fiscal year 1994); EX = the stock exchange where the share is listed, coded as one if listed on the Shanghai Stock Exchange and zero if listed on the Shenzhen Stock Exchange; FOREIGN = a dummy variable for companies also issuing H-shares or B-shares; LSIZE = the log of a company's average daily market value over the seven-day window (day −3 to day 3) around the annual report release; DETRAT = total long-term debt divided by total equity; and CURRAT = current debt divided by current assets.

***, **, * significant at 0.01, 0.05, 0.10, respectively (one-tail for variables with an expected sign and two tail otherwise).

results are consistent with those for the long window and provide further support for Hypotheses 1 and 2.

5.2. *The impact on earnings quality*

Panel A of Table 8 presents the results of a univariate analysis testing for the difference in noncore operating incomes, measured by NROE, between the two auditing regimes. It shows that, on average, NROE decreases from 0.031 in the pre-adoption period to 0.021 in the post-adoption period. This reduction in NROE is significant at $p = .05$. However, there is no significant change in either return on equity (ROE), ROE based only on core operating income (COREROE), or other control variables except for company size (LSIZE), which increases from the pre-adoption period to the post-adoption period.

Panel B of Table 8 reports the results of the regression model (6) testing Hypothesis 3 regarding the impact of the implementation of auditing standards on earnings quality. The dependent variable is noncore income (NROE). Besides the control variables, the independent variables include a dummy indicating whether the observation is from the post-adoption period or not (PERIOD). We expect the coefficient estimate of this dummy to be negative because the implementation of new auditing standards should put more pressure on auditors to detect any earnings management behavior via noncore operating earnings. The results in panel B show that the coefficient on the PERIOD dummy is significantly negative at $p = 0.026$. This suggests that earnings management by the companies is decreasing and less likely to occur in the post-adoption period.

5.3. *The impact on the quality of firm-specific information*

Table 9 reports the comparison of the quality of firm-specific information available to investors, measured by stock-price synchronicity, before and after the implementation of the new auditing standards. Panel A reports that the mean synchronicity level in the A-share market during the post-adoption period is less than that during the pre-adoption period. The mean difference in the level of synchronicity between the pre- and post-adoption periods is statistically significant at $p = 0.0001$, indicating that stock returns are less synchronous in the period subsequent to the implementation of the new auditing standards. These results hold when we analyze the observations from the two Chinese exchanges separately. Hence, we conclude that there was an increase in the quality of firm-specific information. In addition, the magnitude of synchronicity levels is comparable to that reported in Morck et al. (2000), which is 0.453 estimated with the weekly data of 308 Chinese stocks covered in the Data Stream in 1995.

We did not test for the impact of changes in macroeconomic variables on synchronicity levels as in Morck et al. (2000) because the companies in our sample are from the same country. However, since GDP per capita and the number of stocks shares listed in each market are the primary factors that explain cross-country stock-price synchronicity, further evidence is required to identify the plausible explanation for the reduction in price synchronicity. That is, can the change in price synchronicity be due to changes in macroeconomic factors or to a change in institutional regulation (implementation of auditing standards)? To address this issue, we use a control group of B-shares, which are

Table 9

The Impact of increased disclosure on the quality of firm-specific information *T*-test on changes in the synchronicity level

PERIOD	N	Mean	Std. Dev.	Std. Error	T-test	DF	Prob> T
<i>Panel A Synchronicity levels in A-share market pre-adoption period vs. post-adoption period</i>							
A-shares							
0	271	0.597	0.150	0.009	7.4352***	512.2	0.0001
1	271	0.487	0.191	0.012			
SH A-shares							
0	162	0.615	0.138	0.011	3.5118***	320	0.0005
1	162	0.559	0.149	0.012			
SZ A-shares							
0	109	0.569	0.164	0.016	7.7383***	209.5	0.0001
1	109	0.380	0.196	0.019			
<i>Panel B Synchronicity levels in B-share market pre-adoption period vs. post-adoption period</i>							
B-shares							
0	57	0.068	0.112	0.015	-1.9469*	93.7	0.0545
1	57	0.103	0.075	0.010			
SH B-shares							
0	30	0.043	0.061	0.011	-3.7277***	56.2	0.0005
1	30	0.107	0.073	0.013			
SZ B-share							
0	27	0.098	0.148	0.030	-0.0015	35.6	0.9988
1	27	0.098	0.078	0.015			

PERIOD is a dummy indicating the effect of the implementation of new auditing standards, coded as one if the observation is from the post-adoption period and zero if from the pre-adoption period, SH represents the Shanghai Stock Exchange, while SZ represents the Shenzhen Stock Exchange.

***, **, * significant at 0.01, 0.05, 0.10, respectively.

less likely to be affected by the new auditing standards. Panel B of Table 9 presents the descriptive statistics of the synchronicity variable and the *t*-test of difference in means between the pre- and post-adoption periods for the B-shares. We find no evidence in support of a reduction in the synchronicity of B-shares. In fact, the results show a somewhat significant increase in the level of synchronicity for B-shares, which suggests that the reduction in the synchronicity in the A-share market is associated with the implementation of auditing standards.

5.4. Robustness check

To investigate whether our results of trading volume and price volatility are driven by the macroeconomic factors in the emerging markets in China, we examine the changes in trading volume and price volatility of companies issuing B-shares. Since companies that issue B-shares to foreign investors (B-shareholders) already prepare their financial statements under international accounting standards and have them audited under the international auditing standards upon which the new auditing standards are modeled, the B-share market should be less influenced by the implementation of new auditing standards. We conduct the same analyses on trading volume and price volatility in the B-share market as those reported in Tables 5, 6, and 7 for the A-share market (the results for the B-shares are

not reported here). In the long-window analysis, we find a slight upward shift in trading volume (0.198 from the OLS regression and 0.023 from the 2SLS regression, both of which are not significant) and price volatility (0.723 from both regressions which are significant), which are much less than those for the A-share market. In fact, based on OLS and 2SLS, the increase in trading volume and price volatility is significantly larger in the A-share market compared to the B-share market. In addition, the short-window analysis yields no significant results for the B-share market at all. These results suggest that the significant increases in trading volume and price volatility for the A-shares are associated with the implementation of the new auditing standards but not macroeconomic factors. In addition, we separately test firms issuing only A-shares and firms issuing both A-shares and B-shares and find both groups have significant increase in trading volume and price volatility in the A-share market. This might indicate that the A-share investors may have limited access to information accessible to B-share owners, which is consistent with Sami and Zhou (2004) on the market segmentation in China.

To address whether our results on trading volume and price volatility are due to any time trend, we conduct the following additional analyses. We investigate the trading volume and price volatility in the year following the current event year (current event year is the first year auditing standards are implemented) and find that both trading volume and price volatility significantly decrease after the annual disclosures in the following fiscal year. However, both the univariate and multivariate tests show that trading volume and price volatility for the year following the current event year are significantly higher than those prior to the implementation of new standards, indicating the persistence of the effect of implementation of the new auditing standards. All these results indicate that our reported results are not due to a time trend.

Another plausible explanation might be that increasing trading volume and price volatility could be a feature of emerging markets, because there are important policy changes to accelerate the privatization and securitization of the state-owned enterprises, which lead to increases in trading volume and price volatility. If this is true, then one would expect that the trading volume and price volatility of our sample firms would increase all the time rather than around the implementation of new auditing standards. However, the results mentioned above, which show significant decreases in trading volume and price volatility of our sample firms in the year following the implementation compared to the year of implementation, suggests that our results are not driven by the underlying nature of emerging markets.

To ascertain whether our results are driven by any other events, we conduct a search on accounting and auditing regulations in the sample period. However, we do not find any other significant changes in accounting rules and regulations during that period, except those related to the new auditing standards. One direct change in the disclosure regulation was a trivial revision of disclosure guidance issued in December 2005. However, the impact of this revision was not significant, as discussed by Lin and Su (1998): In January 1994, the CRSC released Content and Format of Disclosures of Public Companies No. 1-6 (temporary), which provided detailed descriptions of the accounting disclosures required on the balance sheet, income statement, statement of changes in financial status, footnotes, summary of accounting and business data, management's analysis and discussion, changes in stock shares and shareholders, significant events, and related parties. All companies followed these regulations

in their annual reports for fiscal year 1994. Content and Format of Disclosures of Public Companies No. 2 issued in December 1995 was a trivial revision, which provided direction to public companies on the format of disclosure. Further modifications were issued in December 1998, December 1999, August 2003, and December 2005. Based on the development of accounting-disclosure regulations in China (Lin and Su, 1998), the biggest change introduced by the Content and Format of Disclosures of Public Companies, should appear in the annual reports for fiscal year 2004 rather than fiscal year 1995. Therefore, the impact of the 1995 revision on the annual reports for fiscal year 1995 could be minimal.²²

Prior studies show that there were a significant number of initial public offerings (IPOs) and stock rights offerings in 1996 and 1997, which experienced significant earnings management through noncore earnings (e.g., Aharony et al., 2000; Haw, Wu, & Wu, 2005). To examine whether these market developments affected our results, we check the dataset of initial public offering dates and stock right offerings provided by the Taiwan Economic Journal database (TEJ), and find only three A-share companies in our sample with stock right offerings during our sample period. Further, our sample does not include any IPO firms, since we require that sample firms have equity price data from January 1, 1995, and we use this fixed-firm sample in both the pre-adoption and post-adoption periods. In addition, the effect of IPOs and stock right offerings, if any, would bias the data against our results, which show that firms are less likely to manage earnings in their fiscal year 1995 annual reports than in fiscal year 1994. Therefore, our results could not have been driven by IPO and stock right offerings.

Our earnings-management measure reflects the level of noncore operating income deflated by year-end equity. We perform a robustness check to determine whether our results are driven by using this level of noncore operating income rather than an abnormal measure (e.g., industry adjusted measure of noncore operating income). We re-estimate our models using the industry adjusted NROE and our results are qualitatively the same.

In this study, we obtain the data for companies listed on either the Shanghai Stock Exchange or the Shenzhen Stock Exchange. To check whether results differ by exchange, we perform both univariate and multivariate analyses separately for each exchange and find that the results are qualitatively the same across the two markets. Thus, our results are not affected by any potential heterogeneous problems introduced by using companies listed on different exchanges.

In our trading-volume model we use share turnover as a proxy for trading activity. An alternative specification is the dollar amount of trading volume (Leuz and Verrecchia, 2000). We re-estimate the models using the alternative measure and find that the alternative specification yields qualitatively the same results. Another alternative measure of trading volume is abnormal trading volume. We calculate the mean of share turnover over days -250 to -4 relative to the test period for the short window and over weeks -50 to -1 relative to the test period for the long window. We then calculate the abnormal share turnover over the short (long) window as the difference between these daily (weekly) means and those over the test windows. We re-estimate the models using these alternative measures and find that, with a minor exception, the results are qualitatively the same. The exception is that over the short window, using the 2SLS, the coefficient of PERIOD is positive but not significant. To control for general changes in the market, we also use market-adjusted measures for price volatility, which are

²² Nevertheless, we could not totally eliminate the information content conveyed in a new format of annual disclosure.

calculated as the mean of weekly standard deviation of share return divided by the weekly standard deviation of market return. The results are qualitatively the same as those reported.

A possible missing control variable in the analysis might be auditor type. For instance, Schauer (2003) finds that companies audited by the former Big-Six have lower information asymmetry risk, measured by bid-ask spreads, than those audited by small (non national) firms. The information environment of companies audited by large audit firms may be better than that audited by small audit firms because large audit firms are believed to offer a higher quality audit (e.g., Becker, DeFond, Jiambalvo, & Subramanyam, 1998). Consequently, the new auditing standards may have a different impact on the information environment between the companies audited by large audit firms and those audited by small audit firms. We re-estimate the cross-sectional models with control for auditor size (AUD), coded one if a company is audited by one of the largest 10 accounting firms ranked on the basis of clients' assets and zero otherwise. We find no significant results of the audit-type variable and all other results are qualitatively the same.

6. Conclusions and implications

In this paper, we investigate the impact of increased accounting disclosure on the information environment following the implementation of the first set of auditing standards in an emerging market (China). Because the implementation of new auditing standards can increase both the quality and quantity of accounting disclosure, it can be conceptualized as an improvement in the information environment. Thus, the precision of information regarding a firm's value, earnings quality, and the quality of firm-specific information are expected to increase following the adoption of new standards. Therefore, we propose that Chinese companies would subsequently experience: (1) a significant increase in trading volume and price volatility, (2) a significant reduction in earnings management, hence, an improved earnings quality, and (3) a significant decrease in price synchronicity reflecting more capitalization of firm-specific information relative to general market information.

Consistent with our hypotheses, we find that trading volume and price volatility increase subsequent to the implementation of the new standards. These results indicate that the informedness effect dominates the consensus effect when companies release public information under new auditing standards in an emerging market. In addition, our analyses show a decrease in earnings management, implying an increase in earnings quality. Finally, we find a decrease in the synchronicity of stock prices, suggesting an increase in the quality of firm-specific information available to investors. Our results hold after we control for changes in macroeconomic factors that affect the trading in different stock exchanges, auditor type, and other factors (alternative explanations) through sensitivity tests.

These results have significant implications for standard setters, regulators, researchers, managers and investors in general and those in emerging markets in particular. The results support policy makers' expectation and regulators' assertion that auditing standards, with higher quality, improve market liquidity. In addition, our results imply that the informedness effect and the consensus effect could have different dominating status with different disclosure settings, which calls for further studies in the future and a theoretical model in particular. Last but not least, the findings of the study have implications for the decision making of managers and investors, since managers are less likely to manage earnings and investors can rely on a

higher quality of assurance service from auditors after unprecedented auditing standards take effect.

As with all event studies, it could be difficult to isolate the effects of an event. Using B-share firms as a control group and observations in other non event periods in the sensitivity tests, we have tried to mitigate the effect of extraneous events. To the extent our study has not properly screened out or controlled for such events, our conclusions can be limited. For example, the increases in trading volume and price volatility found in this study for the experimental group A-share firms might be caused by an increase in press coverage, or in the sophistication level of domestic investors, or in the understandability of annual reports under the new format introduced by the revision of disclosure guidance, or in a combination of these factors. These possibilities are not examined in this study; however, our sensitivity tests indicate that there are no such increases in trading volume and price volatility in the year subsequent to the implementation of the new auditing standards. Thus, a continuous and gradual change in the information environment, such as an increase in press coverage, is most likely not a driving force.

In this paper, we find evidence of the dominance of the informedness effect over the consensus effect. However, we did not attempt to address the impact of increased accounting disclosure on the trading volume sensitivity to changes in price volatility. Recent studies (Linsmeier, Thornton, Venkatachalam, & Welker, 2002; Kim and Verrecchia, 2001) indicate that a firm's commitment to increased accounting disclosure could result in a significant reduction in the slope coefficient on trading volume in the returns (prices) models. Future studies may extend this line of research by examining the impact of increased accounting disclosures due to the implementation of new auditing standards on the trading-volume sensitivity to price changes.

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Discussion

Discussant comments for “Do auditing standards improve the accounting disclosure and information environment of public companies? Evidence from the emerging markets in China”

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1. Introduction

Sami and Zhou (2008) (hereafter, SZ) investigate whether the new Chinese auditing standards implemented in 1996 improve the information environment of listed Chinese firms. They use the interesting setting of China's emerging market to study the impact of changes in regulation. To provide evidence on this question, SZ compare trading volume, price volatility, noncore earnings, and return synchronicity between 1995 (pre-adoption period) and 1996 (post adoption period). They find that companies experience a significant increase in trading volume and price volatility, but a decrease in earnings management and the synchronicity of stock prices in 1996, and attribute these favorable changes to the implementation of the new auditing standards. Prior research focuses on how the governance variables, such as legal institutions, ownership structures, external auditing, and analyst following shape the information environment. SZ expand this focus by recognizing that auditing standards also significantly improve the accounting disclosure in emerging markets. The SZ study is interesting and important for understanding the “economic consequences” of new auditing regulations, especially in emerging markets.

However, I have several concerns about the SZ study. The first concern is whether standards alone are likely to affect managers and auditors in China without the presence of

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other proper incentives. The second is whether the study sufficiently disentangles the effect of new auditing standards from other regulatory and market changes in China, which have coincided with the test period. Other concerns are related to the research design and empirical results of the study. I discuss each point below.

2. Do auditing standards matter in China?

The authors argue that auditing standards affect the behavior of auditors, which in turn affects firms' disclosures. However, standards alone may not be likely to affect auditors unless there are also proper incentives and effective monitoring mechanisms. Prior studies suggest that incentives are important in explaining the quality of financial reporting (see, for example, Ball, Robin, & Wu, 2003, on a cross-country study; Ball, Robin & Wu, 2000; DeFond, Wong, & Li, 2000 on China). Ball (2001) further states that actual accounting practice is a function of corporate governance, corporate ownership and control, political factors, the legal system, the training and independence of auditors, and the relation between financial reporting and taxation, as well as accounting standards. Ball, Robin et al. (2000) find that earnings reported by Chinese firms are not conservative, and argue that broader institutional factors are predominant in determining financial statement properties. Changing one element alone (such as auditing standards) may not be effective, unless it is accompanied by a wide range of complementary changes in infrastructure.

Corporate governance systems are less effective in China's markets than those in the West. In the government-controlled economy of China, managers of listed state-owned enterprises (SOEs) are frequently appointed by the government, who is the controlling shareholder. Recent studies show that such ownership structures adversely affect the information environment of these firms, which results in a high level of information asymmetry and a low level of informativeness of accounting earnings (Fan and Wong, 2002; Haw, Hu, Hwang, & Wu, 2004). The managers of listed Chinese firms, where state and legal-entity (mostly SOEs) ownership dominate, are strongly motivated to act in the best interests of the government and its representative organizations, and have less incentive to report high-quality accounting information or seek quality auditing for their financial reports (Ball, Kathari, & Robin, 2000). Until 1998, all domestic auditors were public employees, and there was little incentive for high-quality audits, while litigation for audit failure was infrequent.² In such an environment, it is doubtful whether auditing standards could be effectively implemented.

DeFond et al. (2000) find that the implementation of new Chinese auditing standards results in a higher frequency of non standard audit opinions, but large auditors, normally regarded as high quality, lose market share in terms of both clients and assets audited,

² There are three types of auditing firms in China: government-affiliated audit firms, university-affiliated audit firms, and audit firms that operate as part of a joint venture with an international CPA firm, usually a Big 4 firm. Government-affiliated auditors are affiliated mostly with agencies of the Ministry of Finance and Audit Bureau or with SOEs. University-affiliated auditing firms are part of universities. Neither government- nor university-affiliated audit firms are independent. However, they had all become independent legal entities by the end of 1998 (*Securities Times*, January 5, 1999).

subsequent to 1994. They interpret the large decline in the market share of independent auditors as a “flight from quality,” which is consistent with the argument that Chinese managers avoid auditors that are more likely to issue a modified opinion. Prior studies find that larger auditors in China have stronger incentives to maintain the quality of audits, presumably because they have more to lose if their malfeasance is discovered by the market or regulators (DeFond et al., 2000; Wang, Wong, & Xia, 2005). Thus, the impact of new auditing standards would be stronger among large auditors in China, if such an impact is indeed present. However, the SZ study reports no significant difference in the disclosure-quality improvement between firms audited by large and small audit firms. The lack of cross-sectional variation in the improvement of disclosure quality indicates a possibility that such an improvement may not be necessarily due to new auditing standards but likely caused by some economic factors that affect all firms simultaneously.

3. Are increased trading volume and price volatility the result of the new auditing standards?

SZ investigate whether the implementation of new auditing standards improves the disclosure quality of listed firms in China in 1996, which is the year of the first implementation. Like other studies, which examine the impact of new regulations (e.g., Schipper & Thompson, 1985), the authors face a difficulty in research design as the event window for the entire sample cluster is in the same limited calendar time, and many economic factors that affect the firms’ information environment cannot be randomized. While the authors attempt to address this issue, the approaches used here are not sufficient for inferring the “causal” relationship between new auditing standards and economic consequences.

As an economy in transition, the Chinese government made a series of regulatory changes to accelerate the privatization and securitization of SOEs. Several important events that affected the information environment and empirical results of the study coincided with the test period. For instance, the Chinese Securities Regulatory Commission (CSRC) issued *The Contents and Format of Annual Report* on December 21, 1995 (CSRC No. 2), which formalized disclosure standards for the first time and required more public disclosures (such as MDA and footnote information in the annual report). In June 1996, the CSRC issued *Disclosure Standard No. 3 on the Content and Format of Interim Reports* (CSRC Pronouncement No. 72). This standard requires listed Chinese firms to release semi-annual interim reports by the end of August. Other changes include 17 new Specific Independent Auditing Standards (No. 8 to 24), which are related to subsequent events, related parties, and disclosure and six Independent Auditing Practice Pronouncements (No. 2 to 7) that were issued in 1996 and 1997. All of these regulatory changes could enhance the information environment and disclosure quality from 1996, leading to increased trading volume and stock return volatility.

In addition, there were other macroeconomic factors that affected the trading volume. For example, when the People’s Bank of China stopped providing the inflation-adjusted saving service on April 1, 1996, the dramatically reduced interest rate helped money flow from banks to the stock markets and increased the trading volume and volatility of stock

prices. The Shanghai A-share turnovers increased from 13.9 billion yuan in March to 44.1 billion yuan in April (*Shanghai Stock Exchange Statistics Annual*, 1997). On September 24, 1996, the Shanghai Stock Exchange lowered the commission and handling fee on the stock market, which influenced the trading volume and volatility of stock prices. For the year of 1996, the trading volume on the Shenzhen and Shanghai Stock Exchanges increased 1,053% and 183%, respectively, and the monthly turnover rate reached 100% (January 2, 1997, *Securities Times*). All these concurrent developments could affect both the long- and short-window tests of the current study.

4. Is a decrease in earnings management due to the new auditing standards?

The authors use the noncore ROE (NROE) as a proxy for earnings quality. The NROE comes from below-the-line transactions, such as tax refunds, government subsidies, and sales investments or other assets. This assumes that firms primarily use NROE to inflate bottom-line earnings. This is consistent with prior studies, which find that Chinese firms manage earnings upwards to meet regulatory benchmarks (to apply for stock-rights offerings or to avoid reporting consecutive losses and the possibility of being delisted) (Chen and Yuan, 2004; Haw, Qi, Wu & Wu, 2005). SZ hypothesize and find that NROE decreases after the implementation of the new auditing standards. However, there are alternative explanations to their results. One is the potential impact of IPO firms on the post-issue period. Aharony, Lee, and Wong (2000) find that Chinese firms manage accounting accruals upward during the process of financial packaging, while accruals *decline* after the IPO. Since the Chinese stock markets were reactivated in the early 1990s, a significant portion of the sample firms in the SZ study were likely to go public during 1993 and 1994. It is unclear, then, whether the decreased earnings management in the current study reflects the implementation of the new auditing standards or the *reversal* of upward-earnings management made before the IPOs.

Another potential explanation is related to the lack of control for differences in the firm's operating performance. Aharony et al. (2000) report a significant post issue earnings decline for unprotected-industry firms, which represent a majority of the sample firms in the current study. Prior literature suggests the importance of controlling for a firm's performance in an earnings-management study (Kothari, Leone & Wasley, 2005), and shows that the NROE of Chinese firms is significantly and negatively correlated with operating performance (before earnings management) (Haw et al., 2005). Furthermore, the validity of the SZ study could be enhanced if some type of expectation model was built-in to separate NROE into earnings management and "normal" business operation. The extant literature finds that Chinese managers use NROE as well as accounting accruals to manage earnings (e.g., Aharony et al., 2000; Haw et al., 2005). It would be interesting to check whether NROE and accruals have been "permanently" reduced after the 1996 auditing regulation. In addition, there are other earnings-quality measures to consider. Ball et al. (2000) find that both earnings reported under Chinese GAAP and International Accounting Standards (IAS) are not conservative for Chinese firms issuing A-shares and both A- and B-shares. A recent study by LaFond and Watts (2008) shows that changes in information asymmetry lead to conservatism and conservatism reduces information asymmetry by restricting the manager's ability to manipulate financial reporting. Thus, it could be



Fig. 1. Market indices for Shanghai A- and B-shares (Source: the Trading Database of CSMAR, China Stock Market and Accounting Research).

interesting to see whether conservatism has improved after the implementation of new auditing standards.³

5. Can the B-share market serve as a control for the A-share market?

To control for other economic factors, the authors use B-share firms (which are available only for foreigners during the sample period) as a control.⁴ The rationale was that the B-share firms prepare IAS-based financial reports rather than Chinese-GAAP based reports, and are audited by international auditors. Thus, the authors argue that the new auditing standards should have little impact on their reports, and any difference in the post-event changes in the disclosure quality between A- and B-share firms would imply the effects of new auditing standards, since both groups of firms are equally subject to other economic factors that affect disclosure quality. However, the B-share firms are not likely to be an ideal control sample.

It is well known that the B-share market (characterized by its illiquidity) is entirely segmented from the A-share market (a primary domestic market) during the sample period of this study. Thus, changes in economic factors in the A-share market cannot be assumed to be the same as those in the B-share market. Fig. 1 shows the market indices for the A- and B-shares in the Shanghai Stock Exchange from 1993 to 2000. Overall, the B-share market appears to be

³ The authors use a dummy variable *EX* for firms listed in the Shanghai Stock Exchange. The coefficient on *EX* * *PERIOD* (panel B, Table 8) is significantly positive and larger than the *PERIOD* coefficient. This indicates that for firms listed in the Shanghai Stock Exchange, NROI essentially increased for the post-event period.

⁴ The B-share market has been open to the Chinese domestic investors since 2001.

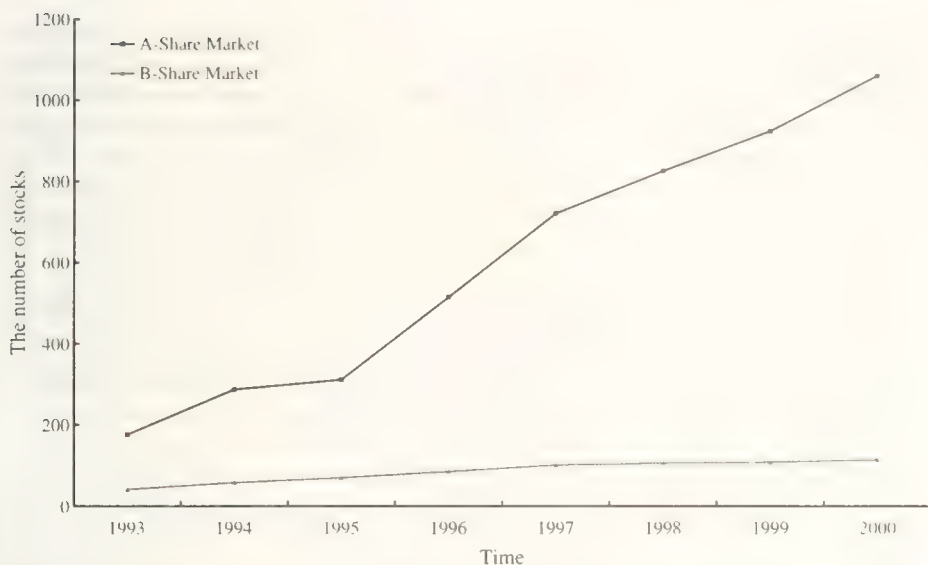


Fig. 2 The number of stocks listed in China's A- and B-share markets (Source: the Trading Database of CSMAR, China Stock Market and Accounting Research).

much less volatile than the A-share market, and more importantly, the co-movement between the two markets is weak.⁵ This suggests that economic factors and market conditions affecting the A-share market could be different from those affecting the B-share market.

The SZ study's pre-event period roughly covers from March 1995 to February 1996, and the post-event period from March 1996 to February 1997 (assuming that firms release annual reports three months after the required fiscal year-end of December). The percentage of market-index changes were 14.8% for A-shares and 8.4% for B-shares during the pre-event period, and 89.1% for A-shares and 33.1% for B-shares for the post-event period. While the performances of the two markets are similar during the pre-event period, the increase in the A-share index is substantially higher than that in the B-share index for the post-event period. The development of the B-share market for foreigner investors has been less impressive than that of the A-share market, possibly due to its segmentation from the primary domestic market. To the extent that changes in economic factors are less influential in the B-share market, changes in disclosure quality among the A-share firms may not be entirely attributable to the presence of new auditing standards in the A-share market. The bull market experienced by the A-share firms might also imply that these firms have more good news to disclose to investors, compared with the B-share firms. To the extent that A-share firms have more disclosures in the post-event period than B-share firms, this could be due to the differential market conditions between the two markets, rather than the new auditing standards per se.

The other major change taking place during the period of interest is the significant increase in the number of new stocks listed in the Chinese Stock Exchanges. Fig. 2 depicts the number of stocks listed at the end of each year in the A- and B-share markets. From the end of 1995

⁵ The pattern is similar for the Shenzhen Stock Exchange.

(close to the pre-event period) to the end of 1996 (close to the post-event period), the number of listed stocks increased by 65.3% and 21.4% for the A- and B-share markets, respectively. The increased number of listed stocks could also affect price synchronicity. In a market where the number of stocks is smaller in 1995, the market index is more likely to be affected by individual stocks, implying a higher synchronicity and a lower disclosure quality. With an increase in the number of listed stocks, the effect of individual stock returns on market returns should become smaller. Again, we expect this phenomenon to be less apparent on the B-share market. Thus, the changes in the information environment among A-share firms may not be entirely attributable to the new auditing standards.

The authors also use short-window analysis to control for other economic factors. While this increases the power of the test, this method may not help mitigate the influence of economy-wide factors. Since the sample firms' observations in the short window cluster in the same calendar time, thus are still subject to the influence of different economy-wide factors and market environments between 1995 and 1996.

My last comment is related to stock-return synchronicity. Hypothesis 4 predicts that price synchronicity decreases subsequent to the implementation of new auditing standards. This is consistent with a recent study by Jin and Myers (2006), which indicates that price synchronicity is associated with corporate transparency. However, Chan and Hameed (2006) find that stock return synchronicity is significantly and positively related to trading volume, suggesting the importance of controlling for the difference in trading volume between 1995 and 1996. Interestingly, Ashbaugh-Skaife, Gassen, & LaFond (2005) claim that synchronicity is not a good measure of firm-specific information in international markets and develop an alternative measure of firm-specific information based on the percentage of zero return weeks.

6. Summary of discussion

SZ address interesting and important research questions from China's emerging markets and test whether the new auditing standards implemented in 1996 improve the information environment of listed Chinese firms. They find that Chinese firms experience a significant increase in trading volume and price volatility, but a decrease in the synchronicity of stock prices and earnings management in 1996. The SZ study contributes to enhancing our understanding of the "economic consequences" of new auditing regulations in emerging markets.

However, the authors face a difficulty in research design similar to other previous studies, because implementation of the new regulations takes place in the same calendar year, which cluster the sample. As a transitional economy, the Chinese government made a series of reporting, auditing, and market regulation changes, which coincided with the test period. All of these concurrent developments affected the firms' information environment and stock market performance in the test period and, thus it is difficult to tease out the effect of new auditing standards. Another difficulty arises from the lack of proper incentives for Chinese managers and auditors as well as weak corporate-governance structures in China. Thus, the documented empirical evidence in the SZ study would suggest an indirect linkage between the new auditing standards and the information environment, rather than "causality." While the authors provide a sensitivity test, it is still unclear whether the impact of the new auditing standards on information environment has been temporary or permanent.

The SZ study provides interesting avenues for future research on emerging markets. Additional research will shed more light on how new auditing standards affect the monitoring role of an audit, the quality of auditing, auditor litigation, and the enforcement of audit standards in a period when the Chinese government has been striving to enhance corporate-governance structure.

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Reply

Reply to discussant comments on “Do auditing standards improve the accounting disclosure and information environment of public companies? Evidence from the emerging markets in China”

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1. Introduction

Professor Haw offers a number of valuable comments and helpful suggestions in his discussion of our paper. His comments substantively fall into two groups: possible alternative explanations of our results and the appropriateness of our control sample. We thank Professor Haw for his insightful review and respond to his comments below.

2. Do auditing standards matter in China?

The discussant argues that auditing standards alone may not be likely to affect auditors in the absence of proper incentives and effective monitoring mechanisms. He opines that actual accounting practice is a function of corporate governance, political factors, the legal system, the competence and independence of external auditors, the relationship between financial reporting and taxation, as well as accounting/auditing standards (Ball, 2001). Therefore, he believes that changes in accounting practice result from a wide range of complementary changes in the overall infrastructure rather than a change in one element alone (such as auditing standards). We agree with the assertion that changes in auditing

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standards alone would not be effective without proper and effective implementation. In the Introduction and Institutional Background sections of our paper, we mention the stricter disciplinary rules, monitoring, and sanctions imposed by the Chinese Institute of Certified Public Accountants (CICPA) and the Chinese Securities Regulatory Commission (CSRC) to effectively enforce the new auditing standards. Realizing that the effects of the standards cannot be separated from implementation forces in practice, our paper focuses on the incremental impact of increased audit quality (due to the implementation of new auditing standards) on the information environment, rather than on whether auditing standards alone affect auditors' behavior and, hence, the disclosure practice of audited firms.

The discussant points out that less effective corporate governance systems (characterized by dominant state and legal-entity ownership) and relatively low litigation risk in China's markets (compared to those in the West) could provide opportunities for managers of listed Chinese firms to act in the best interests of the government and its representative organizations rather than report high-quality accounting information or seek quality auditing of their financial reports (Ball, Kothari, & Robin, 2000). Thus, the discussant is concerned whether auditing standards could be effectively implemented. While we agree that the Chinese markets are emerging markets, where accounting disclosure tends to be low in quality and quantity, as we mention in our introduction, we also believe that in such markets the economic consequences of increased accounting disclosures due to the implementation of a set of auditing standards should be significant. In addition, our paper provides empirical evidence which implies that auditing standards could be effectively implemented. The institutional background, especially the corporate governance features of the emerging markets, makes it important to implement the auditing standards and interesting to study whether there is an incremental impact of increased audit quality (due to implementation of new auditing standards) on the information environment.

The discussant argues that any impact of the new auditing standards would be stronger among large auditors in China. Contrary to this argument, we find that the impact might be less for large auditors. Since the information environment of companies audited by large audit firms is already thought to be better than those audited by small audit firms, because large audit firms are believed to offer a higher quality audit (e.g., Becker, DeFond, Jambalvo, & Subramanyam, 1998), the incremental impact of implementing new standards might be smaller for firms with large auditors than for those with small auditors.

DeFond, Wong, and Li (2000) find that the implementation of new Chinese auditing standards results in a higher frequency of non standard audit opinions; but, subsequent to the implementation of new standards, large auditors lose market share in terms of both clients and assets audited. They interpret the decline in the market share of large independent auditors as a "flight from quality," which is based on the assumption that large auditors provide better audit quality. However, the nature of the emerging stock market and emerging audit market could provide an alternative explanation. When companies go public (IPO firms), they are more likely to retain their original auditors rather than to engage large auditors. Given that the audit market is an emerging market and a significant number of IPOs increases the number of firms in such a market, it would result in a decrease in the market share of top auditors. This is different from those cases in which IPO firms switch from large auditors to small auditors, resulting in a smaller market share for large auditors. Note that during the sample period these switches were very sporadic in China (DeFond

et al., 2000, p.291, footnote 15), which support our alternative explanation above. We believe that our results help readers obtain a broader picture of the impact of new auditing standards on the information environment in emerging markets that is not addressed in the prior literature.

3. Are increased trading volume and price volatility the result of new auditing standards?

The discussant suggests that several important events, such as *The Contents and Format of Annual Report* (CSRC No. 2), *The Content and Format of Interim Reports* (CSRC No. 3, mentioned as CSRC Pronouncement No. 72 in the discussant comment), and other successive sets of new auditing standards, could affect the information environment and empirical results of our study. In the Robustness Check section of our paper, we discuss this issue, particularly regarding CSRC No. 2. As a trivial revision of *Content and Format of Disclosures of Public Companies No. 1–6 (temporary)*, which was implemented in January 1994, the impact of revised CSRC No. 2 and No. 3 was not significant because all public companies followed the regulations in annual reports for their fiscal year 1994, as indicated by Lin and Su (1998). Based on the development of accounting disclosure regulations in China (Lin & Su, 1998), the biggest change introduced by *Content and Format of Disclosures of Public Companies*, if any, should appear in the annual reports for fiscal year 1994 rather than fiscal year 1995. Therefore, the impact of the 1995 revision on the annual reports for fiscal year 1995 would be minimal. Hence, contrary to the discussant's claim, these changes should impact the 1994 annual reports, which would work against finding any results in our study. Finally, the successive new *Specific Independent Auditing Standards* (Nos. 8 to 24) and *Independent Auditing Practice Pronouncements* (Nos. 2 to 7) were implemented in January 1997 and July 1999, which are beyond our sample period and would not affect our results.

The discussant speculates that other macroeconomic factors, such as the changes in the interest rates and commission and handling fees in the stock markets, might have affected the trading volume. In the Robustness Check section of our paper, we address this issue as follows: we calculate the mean of share turnover over days -250 to -4 relative to the test period for the short window and over weeks -50 to -1 relative to the test period for the long window. We then calculate the abnormal share turnover over the short (long) window as the difference between these daily (weekly) means and those over the days (weeks) of the test windows. We re-estimate the models using these alternative measures and find that, with a minor exception, the results are qualitatively the same. The exception is that over the short window, using the 2SLS, the coefficient of PERIOD is positive but not significant. In addition, we use market-adjusted price volatility, which is calculated as the mean of weekly standard deviation of share return divided by the weekly standard deviation of market return. As we note in the Robustness Check section of our paper, the results are qualitatively the same as those reported.

4. Is the decrease in earnings management due to the new auditing standards?

The discussant provides alternative explanations for the decrease in non-core operating income (NROFI) subsequent to the implementation of the new auditing standards. One is the

potential impact of IPO firms on the post-issue period. The discussant wonders whether the decreased earnings management reflects the *reversal* of upward earnings management made before the IPOs. As we mentioned in the Robustness Check section of our paper, our sample firms do not include any observations of IPO firms (remember that the calculation of beta for the pre-implementation period requires 50 weeks' observations on share returns before the annual report release for fiscal year 1994). Since there is no existing evidence indicating a decreasing pattern for the magnitude of the reversal of upward earnings management, our results could not be simply attributed to the IPO firms. In addition, we focus on NROE, which is different from accruals whose reversal feature has been documented by prior literature (e.g., Aharony, Lee, & Wong, 2000). Given that there is limited evidence on the reversal of most below-the-line items, we would like to leave this for future research.

The discussant points out the lack of control for differences in firms' operating performance, which could be another potential explanation for our results. In our paper, we perform a robustness check to determine whether our results are affected by industry using an abnormal measure (e.g., industry adjusted measure of non core operating income). As we report in the paper, our results are qualitatively the same. We do not include operating income in our model because this variable leads to a serious multicollinearity problem. Also, as we indicate in the Robustness Check section of our paper, we perform the analysis of NROE for the two local markets, separately, and find that our conclusion holds in each market.

We concur with the discussant that it would be interesting to investigate whether NROE and accruals have been "permanently" reduced after the introduction of auditing regulation. In addition, future researchers could expand our study by examining whether conservatism improves after the implementation of new auditing standards.

5. Can the B-share market serve as a control for the A-share market?

The discussant believes that B-share firms are not likely to be an ideal control sample because the B-share market appears to be much less volatile than the A-share market and the co-movement between the two markets is weak. We agree that economic factors affecting the A-share market could be different from those affecting the B-share market. However, the difference between the two groups does not prohibit our using the B-share market as a control group.

On the other hand, the discussant argues that the percentage of market index changes are roughly the same during the pre-event period but different for A-shares and B-shares during the post-event period. Actually, this is consistent with our findings that the implementation of new auditing standards has a different impact on the two types of markets. If these two markets had been totally driven by different forces, as the discussant argues, the market index changes during the pre-event would have been different as well. In addition, as we mention in the Robustness Check section of our paper, we used abnormal trading volume to control for other market factors. To control for the general changes in the market, we use market-adjusted measures for price volatility, which is calculated as the mean of weekly standard deviation of share return divided by the weekly standard deviation of market return. As we indicate in our paper, these results are qualitatively the same as those we report.

The discussant indicates that the market index, which is affected by an increase in the number of listed firms, affects stock price synchronicity. He speculates that the changes in price synchronicity in the A-share markets may be entirely attributable to the new auditing standards. We agree with his suggestion that market return could vary with the composition of the market index, while noting that the effect of such a change in the number of stocks could be endogenous in any event study of price synchronicity. We strongly support the discussant's call for more rigorous studies to evaluate the impact of change in the composition of the market index on price synchronicity and explore better measures of firm-specific information.

The discussant recommends that we use trading volume as a control in the analysis of stock price synchronicity. We realize that recent research papers have examined stock return synchronicity using firm-level variables (e.g., Chan & Hameed, 2006) rather than country-level variables (e.g., Jin & Myers, 2006; Morek, Yeung, & Yu, 2000). We agree that a multivariate analysis of firm-specific information could yield more powerful conclusions than the univariate tests used in our paper, while noting that the research in this area demands a rigorous theoretical investigation of stock-return synchronicity. As a sensitivity test, we perform a regression of stock-return synchronicity on the PERIOD dummy and trading volume, which yielded qualitatively similar results as those reported in our paper. We also find that trading volume is significantly and positively related to stock-return synchronicity. This indicates that, although the discussant is right in expecting a relationship between trading volume and price synchronicity, our results are robust with regard to inclusion of such a variable in a multivariate model. Future researchers could explore the determinants of stock-return synchronicity (e.g., analyst following, firm size, trading volume, price volatility, free float, institutional ownership, and corporate governance), as well as its relation to the quality of accounting information. In addition, we concur with the discussant that the issue of measuring firm-specific information could be a fruitful avenue for future research (Ashbaugh-Skaife, Gassen, & LaFond, 2005).

6. Conclusion

We appreciate Professor Haw's helpful suggestions. We concur with him that the research design we use in our paper faces similar difficulties as in other previous studies, because the implementation of new regulations for the entire sample could cluster with other events and news in the same calendar year to show results. However, the robustness checks we perform for alternative explanations and influential factors support our conclusion. We strongly support the discussant's call for additional rigorous research on how the new auditing standards affect the role of audit, audit quality, auditor litigation, and the enforcement mechanism in a period when the Chinese government has been striving to enhance the corporate governance structure.

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Incentives for risk reporting — A discretionary disclosure and cheap talk approach

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Abstract

This paper adopts and reviews discretionary disclosure and cheap talk models to analyze risk reporting incentives and their relation to regulation. Given its inherent discretion, risk reporting depends on disclosure incentives. To assess these incentives the analytical models consider risk reporting as an endogenous feature, thereby providing a benchmark to discuss regulatory attempts. Particularly, discretionary disclosure models refer to verified disclosure, e.g., on risk factors or risk management, whereas cheap talk models refer to unverified disclosure, like managerial forecasts on the impact of risk factors. This provides an analytically-based framework for discussion. Unlike prior literature, which focuses on disclosure cost, I argue that uncertainty of information endowment and issues of credible communication can explain restricted risk reporting observed empirically. Linking regulatory attempts to these restrictions implies that regulation may mitigate the incentives-driven restrictions to some extent, but can have adverse effects on risk reporting. I particularly discuss the link between effective risk monitoring and the precision of risk reporting, the ex post assessment and usefulness of managerial forecasts on impacts of risk factors, the claimed decreasing cost of capital by mandatory risk reporting; and the threat of self-fulfilling prophecies. While the discussion has implications for both specific risk reporting requirements and empirical research, overall results suggest that we should not overestimate the informativeness of risk reporting even in a regulated environment.

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Keywords: Cheap talk; Discretionary disclosure models; Incentives; Regulation; Risk management; Risk reporting

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1. Introduction

In recent years, risk reporting has gained interest in financial reporting practice, regulation, and international research. It is no longer a particularity of the banking and insurance sectors which currently reassess the role of risk reporting for market discipline (BCBS, 2001; IAIS, 2002; Dardis, 2002; Helbok & Wagner, 2006; Crumpton, Linsley, & Shrides, 2006). Changing economic and regulatory environments, more complex business structures and risk management, increasing reliance on financial instruments and international transactions, and prominent corporate crises gave rise to risk reporting in non-financial sectors. In general terms, risk reporting shall allow outsiders to assess the risks of an entity's future economic performance (Schrand & Elliott, 1998; Linsley & Shrides, 2006). Based on an uncertainty-based definition of risk, a risk management perspective, and a review of two major strands of analytic models, this paper analyzes incentives for risk reporting and their relation to regulatory attempts. The paper defines risk reporting as risk-related disclosures, which imply information on the distribution of future cash flows.¹ It covers both verifiable risk reporting, e.g., on risk factors and risk management, and non-verifiable risk reporting, e.g., direct managerial forecasts on the distribution.

Apart from the financial sectors, published research on risk reporting has to date been rather limited. Most efforts are empirical and the assertions are diverse. Parts of the literature consider risk reporting as largely beneficial for disclosing entities, assuming both lower cost of capital (ICAEW, 1999; Solomon, Solomon, Norton, & Joseph, 2000) and disciplining effects on risk management and governance (Linsley & Shrides, 2000; Jorion, 2002). While this implies prevalent incentives to voluntarily report on risk, empirical research documents poor voluntary risk reporting on average (Beretta & Bozzolan, 2004; Mohobbot, 2005). Given this observation, parts of the literature also infer that (some) managers have limited incentives to disclose private risk information and recommend extending risk reporting requirements (Carlson, Loftus, & Miller, 2003; Lajili & Zéghal, 2005a). However, empirical studies find large variations and deficits in risk reporting even in the presence of disclosure rules (Rajgopal, 1999; Kajüter & Esser, 2007). What emerges is in line with recent accounting research findings (Ball, Robin, & Wu, 2003; Ewert & Wagenhofer, 2005): Incentives matter even in the presence of regulation. This is particularly likely when considering risk reporting, because it is subjective and partly non-verifiable, which inherently allows for discretion. Yet, there is very little work on risk reporting incentives and their relation to regulation, in general, and even less going beyond the question of whether or not to impose mandatory disclosure, in particular.

This paper addresses this gap. Particularly, it adopts and reviews discretionary disclosure models and cheap talk models to analyze risk reporting incentives and their relation to regulation. Given room to exercise discretion, both strands of analytic models consider disclosure as endogenous and investigate whether and how managers disclose private information possibly available to them due to strategic interaction with other parties, i.e., without an exogenously imposed duty to disclose through mandates. Mandatory disclosure refers to the existence of disclosure regulation. While any disclosure in a voluntary

¹ The reference to the distribution follows from the concept of risk, while the focus on cash flows is consistent with both regulatory intention (AICPA, 1987; Schrand & Elliott, 1998; ICAEW, 1999; GAS 5.9) and the connection of cash flows and firm value (Dye, 2001).

disclosure regime is discretionary, discretion in risk reporting is given in mandatory disclosure regimes as well. The latter stems from disclosure rules allowing for the choice of quality of information disclosed (Combes-Thuélín, Henneron, & Touron, 2006) and, more fundamentally, from the discretion inherent in risk reporting. Basically, discretionary disclosure models assume verified and credible disclosure and consider a manager's incentives to disclose or withhold information about which he may have knowledge (Verrecchia, 2001). Cheap talk models assume unverified (covering non-verifiable) disclosure. These models analyze how much, if any, information can be credibly disclosed when direct, plain communication is cheap, i.e., costless and non-binding (Crawford & Sobel, 1982). Refining risk reporting to imply that information on the distribution of future cash flows of the reporting entity acknowledges its forward-looking and probabilistic nature and is useful for adopting the models. Particularly, I review discretionary disclosure models that feature verified disclosures which imply either the variance or the level of future cash flows, and cheap talk models that consider unverified disclosure, particularly noisy and interval forecasts, in single- and multi-period settings.² While Linsley and Shrive (2000) suggest other strands of theory to explain voluntary risk reporting, the two strands chosen for this study consider risk reporting as an endogenous feature and, thus, are motivated from risk management and game setting perspectives. They capture the fundamental properties of risk information and yield an analytically-based framework for discussion.

Although few of these models formalize regulation (e.g., Jorgensen & Kirschenheiter, 2000, 2003), they assess the inherent and incentives-driven restrictions of voluntary risk reporting and thereby provide a benchmark for discussing various regulatory attempts that go beyond imposing mandatory disclosure. Particularly, the analytic models imply three major reasons why a manager may not report on risk. These stem from (1) uncertainty of risk information endowment; (2) unverified (including non-verifiable) and thus possibly non-credible reporting; and (3) the threat of economic disadvantages. Regulation addresses these restrictions directly by (1) requiring adequate risk management systems; (2) enforcement mechanisms, like audit and liability; and (3) mandating risk reporting (Solomon et al., 2000; Dobler, 2004). This allows for a combined analysis. Additionally, the analytic models yield implications for specific risk reporting rules, which are only partly addressed by recent disclosure requirements.

My main results confirm that regulation cannot overcome incentives in risk reporting at each level of analysis. If a manager does not report because he has no risk information or pretends not to have any, requiring a minimum level of information endowment through risk management benchmarks the margins for discretion, but cannot eliminate them even in case of verifiable information. For both verified and unverified disclosure, more precise information held by the manager does not necessarily imply more precise risk reporting. This is partly due to both the restrictions to credible disclosure and the possibility of misreporting private risk information when considering unverified disclosure. Particularly, as neither ex post nominal actual value comparisons nor audit can significantly contribute to credibility, but may have adverse effects on disclosure, I dispute, for example, the usefulness of managerial forecasts on the impact of risk factors. Within the given framework, I find that disclosure cost, including an increasing cost of capital, is consistent with managers' opposition to strictly mandatory risk reporting. However, given discretion even

in mandatory disclosure I argue that the threat of commercial drawbacks is likely to be mitigated, thereby reaffirming prior literature, which suggests extending mandatory disclosure for information purposes. While presenting implications for specific risk reporting requirements, I conclude that the informativeness of risk reporting should not be overstated even in a regulated environment.

The paper proceeds as follows. Section 2 provides background to motivate the analytic framework. Section 3 reviews discretionary disclosure and cheap talk models. Section 4 discusses the implications of risk reporting incentives as they relate to regulatory attempts, followed by conclusions that involve implications for future empirical research.

2. Background

2.1. *Characterization of risk reporting*

Notions of risk encompass an uncertainty-based and a target-based view. The former defines risk as randomness or uncertainty of future outcomes that can be expressed numerically by a distribution of outcomes (Knight, 1921). The latter defines risk as the potential deviation from a benchmark or target outcome (Borch, 1968). Either way, risk relates to a distribution of future outcomes (Corby, 1994; Doherty, 2000). Risk information, thus, can be defined as risk-related information on that distribution. While this paper relies on the uncertainty-based definition, the supplemental target-based view is necessary to distinguish potential loss and potential gain, referred to as downside risk and upside risk, respectively.

In a business context, risk can be driven by various external and internal risk factors or sources. The risk factors comprise, for example, politics, regulation, and market, as well as finance, business process, and personnel. Any and all of them potentially affect an entity's future performance. From a portfolio perspective, some of the risks arising are systematic, i.e., non-diversifiable, while others are non-systematic and diversifiable by measures of risk management. Corporate risk management continuously aims at identifying risk factors, analyzing and evaluating their potential impact on future outcomes, and addressing the distribution by means of risk handling where appropriate. The phases apart from risk handling constitute a risk monitoring system (Williams, Smith, & Young, 1998). Given an effective risk management system, a manager can be assumed to hold more risk information on risk factors, corporate risk management, and their potential impact on the entity's future performance, than outsiders, who have no access to internal information sources. Thus, disclosure of risk information can reduce this information asymmetry (Linsley & Shrides, 2000; Lajili & Zéghal, 2005a). It shall satisfy an information function and more specifically an early-warning function for outsiders.

Risk reporting shall provide risk information that allows outsiders to assess the risks of an entity's future economic performance (Dobler, 2005; Linsley & Shrides, 2006). Particularly, regulators refer to information to "assess the risks and uncertainties concerning a business enterprise's future cash flows" (AICPA, 1987, p. 3; also Schrand & Elliott, 1998; ICAEW, 1999; GAS 5.9). Put in formal terms and consistent with risk analysis approaches based on Hertz (1964) and Mallinson (1974), risk reporting shall help assessing the distribution of future cash flows of the reporting entity or parameters of the distribution. This broad view covers disclosures (1) on risk factors of all categories; (2) on risk management or phases of it;

Table 1

Comparison of risk reporting requirements in the United States of America, according to IFRSs, and in Germany

	USA	IFRSs	Germany
Regulatory approach	Piecemeal approach	Piecemeal approach	Comprehensive approach
Major regulation	<ul style="list-style-type: none"> ▪ SFAS 5, 131, 133; SOP 94-6 ▪ SEC Regulations, FRR 48 	<ul style="list-style-type: none"> ▪ IAS 1, 37; IFRS 7 	<ul style="list-style-type: none"> ▪ §§ 289(1), 315(1) Commercial Code ▪ Professional standards GAS 5, 20
Reporting instruments	<ul style="list-style-type: none"> ▪ Notes ▪ SEC forms, MD&A 	<ul style="list-style-type: none"> ▪ Notes ▪ Management commentary proposed 	<ul style="list-style-type: none"> ▪ Separate risk report in the management report ▪ Few note disclosures
Notion of risk	Various, mainly uncertainty-based	Various, mainly uncertainty-based	Upside and downside risk, GAS 5 focusing on downside risk
Risk management disclosures	Mainly concerning use of financial instruments	Mainly concerning use of financial instruments	Covering entire corporate risk management
Focus of risk disclosures	Financial and market risk, contingencies	Financial and market risk, contingencies	Risk of any category, financial risk highlighted
Disclosure of risk concentrations	Financial risk, major customers and other	Mainly financial risk	Any risk concentration
Disclosure of going-concern uncertainties	Required only by audit standards (SAS 59)	Required in notes	Required in risk report and in notes
Risk quantification	Required for financial risk, for contingencies, where practicable	Required for financial risk, for contingencies, where practicable	Required for any risk, where practicable, financial risk highlighted
Disclosure of risk forecasts	Not required, encouraged in MD&A	Not required	Required
Negative reports	Not required	Not required	Not required
Special opt-out clause	No	Yes (IAS 37.92)	No

and (3) of risk forecasts, i.e., direct managerial forecasts of the distribution of future outcomes or their parameters as long as they can be scaled in terms of future cash flows.³ These elements of risk reporting differ in their *ex ante* verifiability when disclosed. Disclosures on risk factors and risk management systems including the means of risk handling when implemented are generally verifiable. In contrast, risk forecasts are not. The distinction of verifiable and non-verifiable risk information has fundamental implications. Verifiable risk information can be disclosed verified or not, while non-verifiable risk information can only be disclosed unverified. While verified risk reporting is credible in itself, unverified risk reporting may or may not be credible. This finally defines whether discretionary disclosure or cheap talk models apply.

³ While financial and market risk can be directly expressed in terms of cash flows, in the end virtually all risks,

⁴ Legal, regulatory, business process, and personnel risks, affect the distribution of cash flows and may be put in these terms (Schrand & Elliott, 1998).

Corporate risk management determines risk reporting in two major ways. First, as risk monitoring and management are the information source for risk reporting (Solomon et al., 2000), the possible information content of risk reports is linked to the information endowed by corporate risk management. Second, and less considered in the literature, risk reporting can be used as an instrument for risk handling if there is room for discretion, in the sense of reporting choices concerning disclosure, its format, or precision. Given incomplete foresight and the subjective and the partly non-verifiable nature of risk reporting, a manager can report on risks in different ways. If these reporting alternatives induce different decisions and actions, the manager can direct the users' reactions and particularly manage "derivative" risks arising from such reactions to some extent. This characterizes risk reporting as a means of risk handling.

2.2. Disclosure rules

While some discretion is inherent in the nature of risk reporting, regulation may limit discretion compared to voluntary reporting by mandating risk disclosures by type and format. Most regimes follow a piecemeal approach. They mandate selected risk-related disclosures referring to specific categories of risks as opposed to requiring comprehensive risk reporting. A notable exception is Germany that has a separate standard GAS 5 on comprehensive risk reporting (Beretta & Bozzolan, 2004; Dobler, 2005; Mohobbot, 2005). To illustrate the variation in disclosure regulation, Table 1 compares three regimes: (1) the United States of America as a typical case law country with reporting requirements according to U.S. GAAP and by further SEC rules; (2) IFRSs⁴ as an international financial reporting system; and (3) Germany as a typical code law country which is assigned a forerunner role in comprehensive risk reporting regulation.

Risk reporting requirements of U.S. GAAP and IFRSs are roughly comparable. Particularities concern the disclosure of going-concern uncertainties (IAS 1.25) and the special opt-out clause in IAS 37.92. The opt-out clause allows omitting some disclosures required about contingencies "in extremely rare cases" where disclosures "can be expected to prejudice seriously the position of the entity in a dispute with other parties". Both regimes use various notions of risk, but do not mandate risk forecasts. Disclosures are located in the notes and focus on contingencies (SFAS 5; SOP 94-6; IAS 37), financial and market risks, and their management (SFAS 133; IFRS 7). German regulation, mainly set out in GAS 5, differs in all these respects.⁵ It mandates a comprehensive and self-contained risk report located in the

⁴ Following IAS 1.7, I refer to IFRSs as the entire system of International Financial Reporting Standards, including standards (IAS and IFRS) as well as interpretations (SIC and IFRIC) adopted by the IASB. For a brief survey of risk disclosures required by IFRSs also see Combes-Thuëlin et al. (2006).

⁵ Since 1998 the German Commercial Code has been requiring German middle-sized corporations, large private firms, and groups to report on the risks of their future development in the annual management reports accompanying their financial statements. The German Accounting Standard (GAS) 5, issued in 2001, specifies the legal risk reporting requirement. Irrespective of whether the entity prepares financial statements under U.S. GAAP, IFRSs, or German Commercial Code, GAS 5 applies for group risk reporting and its application is recommended for individual risk reporting (Dobler, 2005). GAS 5.9 defines risk as "the possibility of a future negative impact on the economic position," where "economic position encompasses the ... ability to generate net positive cash flows in the future." "Risks shall be quantified where this can be done with reliable and recognised methods" (GAS 5.20).

management report, a reporting instrument largely comparable to the MD&A in the U.S. or the management commentary proposed by the IASB (2005). While the scope of GAS 5 is more comprehensive, covering risks of all categories, the entire corporate risk management and forecasts, its disclosure requirements are rather general and less specific and less detailed than those of U.S. GAAP and IFRSs.

The comparison is consistent with the notion that a piecemeal approach relies on voluntary risk reporting beyond specific mandatory disclosures, whereas a comprehensive approach is inevitably more flexible to allow for entity-specific adoption of risk reporting requirements (Schrand & Elliott, 1998). As either approach allows for managerial discretion, incentives are likely to play a major role in risk reporting, even in a (partly) regulated disclosure regime.

2.3. Empirical evidence

A growing body of published empirical studies aims at risk reporting. A considerable strand of North American research, including Rajgopal (1999), Roulstone (1999), Hodder, Koonce, and McAnally (2001), Jorion (2002) and Linsmeier, Thornton, Venkatachalam, and Welker (2002), addresses mandatory market risk disclosures according to FRR 48. The studies find evidence consistent with an impact of risk disclosures on capital markets. Yet, the particular impact depends on the reporting format chosen. Further research surveyed by Combes-Thuëlin et al. (2006) documents restricted risk disclosures in special settings with large political and environmental risk exposure. Other studies address risk reporting more comprehensively. Apart from questionnaire survey results by Solomon et al. (2000) documenting a preference for voluntary risk reporting assumed to be useful for investment decisions among UK institutional investors, the studies on comprehensive risk reporting rely on content analysis of annual or management reports. Table 2 summarizes these studies.

Despite piecemeal evidence so far and reliance on risk reporting quantity rather than quality (Botosan, 2004), empirical findings are consistent with the size effect but, overall, document limited risk reporting comprising mainly qualitative disclosures. Risk reporting largely varies across entities in both voluntary and mandatory reporting regimes. If a manager has access to risk information, e.g., by means of risk management systems, deficits in voluntary risk reporting imply managerial incentives to withhold private information. Diverse application of requirements and non-compliance in a mandatory risk reporting regime are consistent with (some) managers actually exercising the discretion given by reporting choice or by weak enforcement. The results highlight the role of risk reporting incentives even in (partly) regulated regimes.

3. Discretionary disclosure and cheap talk models on risk reporting

3.1. Characteristics and structure

Since a manager is likely to hold more risk information relevant to assess the distribution of future cash flows and can exercise discretion in disclosing it, rational outsiders will try to assess the manager's risk reporting strategy as a means of risk handling and respond to it accordingly. As the manager anticipates the outsiders' reaction strategy, a disclosure game setting emerges. This provides a rationale to assess risk reporting by discretionary disclosure and cheap talk

Table 2
Empirical studies on comprehensive risk reporting

	Method and sample	Main results
Bungartz (2003)	<ul style="list-style-type: none"> ▪ Content analysis ▪ 117 management reports of German listed companies (2000) 	<ul style="list-style-type: none"> ▪ Large variation in mandatory risk reporting before implementation of GAS 5 ▪ Risk reports mainly qualitative; poor disclosures on interrelations of risk factors; few risk forecasts
Carlson et al. (2003)	<ul style="list-style-type: none"> ▪ Content analysis ▪ 54 annual reports of Australian mining companies (2000) 	<ul style="list-style-type: none"> ▪ Large variation in voluntary risk reporting ▪ Diverse application of risk reporting requirements related to financial instruments
Kajüter and Winkler (2003)	<ul style="list-style-type: none"> ▪ Content analysis ▪ 247 management reports of German listed companies (1999–2001) 	<ul style="list-style-type: none"> ▪ Large variation in mandatory risk reporting ▪ Risk reports mainly qualitative; poor disclosures on risk assessment; few risk forecasts ▪ Increasing quantity of risk disclosures over time, but non-compliance with GAS 5 requirements
Fischer and Vielmeyer (2004)	<ul style="list-style-type: none"> ▪ Content analysis; GAS 5-based disclosure index ▪ 346 management reports of German listed companies (1999–2002) 	<ul style="list-style-type: none"> ▪ Results consistent with Kajüter and Winkler (2003) ▪ Own disclosure index unaffected by size effect
Beretta and Bozzolan (2004)	<ul style="list-style-type: none"> ▪ Content analysis; disclosure index and regressions ▪ 85 annual reports of Italian listed companies (2001) 	<ul style="list-style-type: none"> ▪ Voluntary risk reporting mainly qualitative; few disclosures on interrelations between risk factors and their potential impact ▪ Own disclosure index unaffected by size effect
Lajili and Zéghal (2005a)	<ul style="list-style-type: none"> ▪ Content analysis ▪ 300 annual reports of Canadian listed companies (1999) 	<ul style="list-style-type: none"> ▪ Large variation, particularly in voluntary risk reporting ▪ Risk reporting mainly qualitative; few disclosures on risk assessment; few risk forecasts
Lajili and Zéghal (2005b)	<ul style="list-style-type: none"> ▪ Content analysis; disclosure index and regressions ▪ 230 annual reports of Canadian listed companies (2002) 	<ul style="list-style-type: none"> ▪ Results consistent with Lajili and Zéghal (2005a) ▪ Positive association of risk disclosure quantity and characteristics of corporate governance
Mohobbot (2005)	<ul style="list-style-type: none"> ▪ Content analysis; disclosure index and regressions ▪ 90 annual reports of Japanese listed companies (2003) 	<ul style="list-style-type: none"> ▪ Large variation in voluntary risk reporting ▪ Risk reporting mainly qualitative; few risk forecasts ▪ Evidence consistent with size effect
Linsley and Shrive (2006)	<ul style="list-style-type: none"> ▪ Content analysis; disclosure index and regressions ▪ 79 annual reports of UK listed companies (2000) 	<ul style="list-style-type: none"> ▪ Large variation in risk reporting, particularly few quantitative disclosures ▪ Evidence consistent with size effect ▪ Negative association of risk disclosure quantity and environmental risk exposure, but not with other proxies for the level of corporate risk
Kajüter and Esser (2007)	<ul style="list-style-type: none"> ▪ Content analysis ▪ 92 management reports of German listed companies (2005) 	<ul style="list-style-type: none"> ▪ Large variation in mandatory risk reporting (on both upside and downside risk), particularly few quantitative disclosures ▪ Evidence consistent with size effect

models (Verrecchia, 2001; Dye, 2001). The models consider disclosure as an endogenous feature arising in the course of strategic interaction with outsiders, e.g., shareholders or competitors, as opposed to exogenously imposed strictly mandatory disclosure.

Concerning endogenous disclosure, the unraveling principle implies full disclosure (e.g., Akerlof, 1970; Milgrom, 1981). It relies on a manager who aims at maximizing firm value, which is consistent with maximizing cash flows in the case of the firm's liquidation assumed in this framework.⁶ The manager will always fully reveal his private information if three major conditions are met cumulatively: First, disclosure is not associated with cost, which is amended if risk reporting causes direct cost, e.g., by publishing, or indirect cost, e.g., by harmful reactions of competitors upon disclosure (Corby, 1994; Linsley & Shrives, 2000). Second, it is common knowledge that the manager has information of the type under consideration, which is particularly unlikely for emerging risk factors or much of forward-looking information (Dye, 2001; Verrecchia, 2004). Relying on verified disclosure, discretionary disclosure models analyze the impact violations of these assumptions on the full disclosure result. To cover risk reporting, in particular, I synthesize models featuring the disclosures that imply information on the variance or the level of future cash flows. The third condition assumes that if a manager discloses, disclosure is verified. This particularly does not hold for risk forecasts, which are non-verifiable (Ijiri, 1975; Dobler, 2004). To assess how unverified (covering non-verifiable) disclosure affects risk reporting and its credibility, I synthesize both single-period and multi-period cheap talk models.

Although these features acknowledge the discretion as well as the probabilistic and partly non-verifiable properties of risk reporting, the models discussed rely on assumptions that limit their coverage (Wagenhofer, 2004). They capture neither all facets of risk reporting, e.g., risk categorization, nor all incentives for disclosing or withholding private information, e.g., personal reputation of the manager.

3.2. Discretionary disclosure models on verified risk reporting

3.2.1. Disclosure cost

Relying on informed managers and verified disclosure, a major strand of discretionary disclosure models analyzes how disclosure cost amends the full disclosure result. As a manager will disclose his private risk information if the entity's valuation or future cash flow is higher compared to non-disclosure, his disclosure decision depends on the information endowed and the cost related to risk reporting.

Jorgensen and Kirschenheiter (2003) use a setting in which managers can disclose the firm-specific variance of future cash flows to risk-averse investors at a fixed cost. They find that only variances below a threshold level, i.e., favorable information for risk-averse investors, will be disclosed. There is a non-disclosure (full disclosure) equilibrium if costs are sufficiently large (low). For intermediate levels of cost, partial-disclosure equilibria are obtained and the threshold increases as the cost or the investors' risk aversion increases. Since in partial-disclosure equilibria only low variances are disclosed, an entity will have a higher value when the manager discloses than when the manager withholds the variance. It should be noted that

⁶ The assumption that an entity's manager aims at a high firm value rules out major agency problems. Share-based payment or striving for reputation provides a rationale for managers to behave in the described way (Verrecchia, 2001).

other models, featuring the disclosure of information on the level of future cash flows, show that a manager's reporting strategy is not necessarily linked to a single threshold when disclosure costs are not fixed (for survey see Verrecchia, 2001; Dye, 2001).

Specifically, Jorgensen and Kirschenheiter (2003) find that imposing strictly mandatory disclosure (non-disclosure) of the variance decreases (increases) the expected firm value at an ex ante stage compared to a voluntary disclosure regime. In a multifirm context, they show that the CAPM holds in partial-disclosure equilibria. If a manager discloses the variance, the market risk premium, the firm's beta and the firm's risk premium increase in the published variance. In consequence, a firm's beta and risk premium are lower if the manager withholds than if he discloses the variance. A broad interpretation of this result qualifies a common hypothesis by Barry and Brown (1985) who argue that higher dispersion in the investors' prior beliefs results in a higher risk premium. The weakly increasing risk premium and cost of capital in a mandatory compared to a voluntary reporting regime provide a rationale for managers to oppose the implementation of strictly mandated risk disclosures in the given setting.

3.2.2. Uncertainty of information availability

Uncertainty about whether the information considered is available to the manager technically works like disclosure cost. In such settings, a probability (above zero but below one) that the manager is informed is common knowledge. An uninformed manager cannot disclose anything, not even the fact of being uninformed. An informed manager can choose to reveal his private information. Even anticipating this behavior, outsiders cannot fully unravel the manager's private information. If no disclosure is observed, the outsiders are uncertain whether the manager is informed and withholds unfavorable information, or whether the manager is not informed and has nothing to disclose (Jung & Kwon, 1988). Given incomplete foresight, this setting is pertinent when considering risk reporting.

Modifying their setting, discussed in the last section, Jorgensen and Kirschenheiter (2000) show that only variances below a threshold are disclosed. The higher the probability of information availability is, the more unfavorable, i.e., larger variances will be disclosed. Similar results are obtained if an uninformed manager can invest at some fixed cost in an information source which generates perfect information about the firm-specific variance. Introducing strictly mandatory disclosure and investment in the risk monitoring system will only lead to more risk disclosure compared to partial-disclosure equilibria in a voluntary reporting regime if the cost is sufficiently high. That is, imposing mandatory risk reporting does not change equilibria if there are sufficient incentives for disclosure.

Further models refer to the level of future cash flows. Jung and Kwon (1988) show that an informed manager is more likely to disclose when the outsiders' prior beliefs are less favorable or as the probability of being informed increases. Dye (1998) finds that the threshold decreases as the probability that an outsider knows that a manager is informed increases. Both models demonstrate that incentives for risk reporting depend on information already available to the outsiders. More particularly, Dye and Sridhar (1995) analyze a multifirm setting and assume that receipt of information is positively related among firms. Under certain conditions, disclosure occurs in herds. If a minimum number of entities disclose the information under consideration, the other entities will follow. This herd effect can apply to economy-wide or to industry-wide risks.

Considering incomplete information probably held by the manager, Penno (1997) finds that the ex ante information quality and the ex ante probability that a manager will disclose voluntarily are not necessarily positively related. Consistent with Penno (1996) and Richardson (2001) in different settings, but contrary to the popular notion, this implies that higher-quality information endowed by risk management systems is not necessarily accompanied by more precise risk reporting. Shin (1994) analyzes a managerial information system which provides a set of information partitions. He documents favorably biased interval disclosures and finds that the firm's valuation rises as the firm's (publicly known) information system becomes finer. That implies managerial incentives to establish a high-quality risk monitoring system and to convince the outsiders of its existence.

3.3. Cheap talk models on unverified risk reporting

3.3.1. Single-period cheap talk

Credibility is an inherent problem of non-verifiable risk disclosures. Particularly, risk forecasts cannot be judged to be true when disclosed (Ijiri, 1975). While the manager can utilize this fact to misreport private information, a rational outsider doubting its credibility will ignore the disclosure. Cheap talk models consider disclosure, which is non-verifiable or unverified and not necessarily linked to the manager's private information. Disclosure only affects payoffs if the receivers respond to it (Aumann & Hart, 2003). In non-trivial settings multiple equilibria occur, some of which represent credible and informative communication due to rival reporting incentives of almost equal weight. Single-period models impose rival disclosure incentives by simultaneously sending one message to two audiences with diverse concern, usually shareholders and competitors (Newman & Sansing, 1993; Gigler, 1994; Wagenhofer, 2000). Credible communication is only possible in partitions (Crawford & Sobel, 1982). In such partition equilibria, the manager sends a message that reflects his private information with some noise by stating an interval forecast of possible outcomes covering the outcome implied by his private information, while the outsiders can assess the forecast as credible given common knowledge on the setting.

Newman and Sansing (1993) model an entry game. They assume that the manager seeks to correctly pass his private information to a shareholder, while trying to pass unfavorable (possibly biased) information to a potential competitor to deter his costly entry in the product market. Full disclosure of private information is no part of an equilibrium. There are multiple partition equilibria in which the manager discloses interval forecasts which are informative and assessed to be credible. These are intervals implying unfavorable outcomes, the disclosure of which deters the competitor's entry, and intervals implying favorable outcomes, the disclosure of which leads the competitor to enter the market. Credible communication requires some noise. This prevents a manager whose utility function equals the one of the shareholder from exactly revealing his private information endowed by risk management systems and is consistent with later evidence provided by Gigler (1994) and Wagenhofer (2000). Favorable forecasts may be disclosed more precisely than unfavorable ones, which suits empirical evidence (Healy & Palepu, 2001). The result implies that a manager cannot credibly and exactly disclose the most unfavorable risk forecasts, e.g., concerning a future corporate failure. Considering imperfect information available to the manager, Fischer and Stocken (2001) also show that ex ante forecast precision does not always increase in the precision of the manager's

private information. Consistent with Penno (1997) in the context of verified disclosure, this implies that precise information endowment through high-quality risk management systems does not always lead to more precise risk reporting.

The single-period cheap talk models show that risk forecast must be noisy to be credible and informative. Among the equilibria with credible and informative interval forecasts, the finest and most informative equilibrium with the smallest intervals is not necessarily obtained (Newman & Sansing, 1993; Fischer & Stocken, 2001).⁷ Although even very imprecise risk forecasts observed empirically can suit the mechanism to impose credibility, credible and informative risk forecasts do not necessarily occur. If so, the result relies on outsiders that can perfectly assess the manager's rival reporting incentives in a multi-audience setting.

3.3.2. *Multi-period cheap talk*

Unlike their single-period counterparts, multi-period approaches do not rely on a manager acting in the interest of (current) shareholders. Models impose conflicting reporting incentives by assuming moral hazard but limiting the manager's self-serving disclosure by providing the outsiders with a monitoring system that allows for punishing a "misreporting" manager (Benabou & Laroque, 1992; Stocken 2000; Morris, 2001). The imperfect monitoring system is usually formalized by an ex post nominal actual value comparison, i.e., comparing the disclosed and the realized values. If no material deviation is detected, the disclosure is classified as truthfully reflecting the manager's private information. Otherwise misreporting of private information is assumed.

While there is no credible disclosure in a single-period context, Stocken (2000) derives conditions for credible disclosure in repeated games. Each period, a manager endows private, imperfect information on future cash flows from investments and can disclose a noisy forecast to a representative investor implying favorable or unfavorable future outcomes. After receiving the noisy forecast and assessing its credibility, the investor decides whether to provide further capital to the manager. At the end of each period, information in annual reports allows for an ex post nominal/actual value comparison with some noise. A manager can build reputation and trust by having past forecasts being classified ex post as truthful. The repeated game results in equilibria in review phases. Unlike Benabou and Laroque (1992), documenting that truthful disclosure of private information is an exceptional equilibrium strategy and Morris (2001), documenting that truth telling is not an equilibrium strategy, Stocken (2000) finds a perfect public equilibrium in which a manager nearly always truthfully discloses his private information as a risk forecast.

This result assumes several conditions. They include (1) that a manager is not purely short-term focused; (2) that review phases and, thus, interaction be sufficiently long; and (3) that annual reports provide sufficient information to assess prior forecast disclosure ex post. Manager fluctuation, short-term speculation, or severe going-concern uncertainties are empirically documented factors providing incentives for misreporting (e.g. Headlock &

⁷ These equilibria cannot necessarily be organized according to the Pareto criterion (Newman & Sansing, 1993). However, the Pareto criterion is inadequate to assess the "usefulness" of perfect Bayesian equilibria as long as it is focused on players who are exclusively interested in their own payoffs. Then, possible Pareto improvements do not induce a change in individual behavior.

Lumer, 1997; Nyman 2005). This evidence challenges conditions (1) and (2) in an environment where corporate risk exposure tends to be large. While condition (3) relies on specific accounting items to conduct the nominal/actual value comparison, the mechanism *per se* is questionable as discussed in Section 4.3. Overall, cheap talk models imply that credible risk forecasts are hardly obtained in an unregulated environment.

4. Implications and discussion

4.1. Incentives versus regulation revisited

Discretionary disclosure and cheap talk models provide a distinctive analytical perspective on risk reporting incentives and allow us to assess them in relation to regulation. Particularly, they yield a benchmark for assessing the effect of regulatory attempts, even if regulation is only partly formalized in these models.

As a general result, incentives for risk reporting do not appear as prevalent as suggested by some authors. Prior risk reporting literature has focused on disclosure cost including the threat of litigation to explain why managers do not disclose private risk information (Linsley & Shrives, 2000, 2006; Lajili & Zéghal, 2005a). The above review qualifies this view. While true when considering verified disclosure, single-period cheap talk models show that “cost” is the key to credible, unverified, risk reporting. Moreover, the analytical models imply three major explanations for restricted risk reporting observed empirically. (1) A manager may not report because he does not or pretends not to hold risk information. This relates to models of uncertainty of information availability. (2) A manager may not report available risk information either because he cannot credibly do so or chooses to misreport. This level is mainly captured by cheap talk models, particularly in connection with forecasts. (3) A manager may not report risk information because he fears creating disadvantages for the firm. That relates to the cost factor that is formalized in both discretionary disclosure and cheap talk models.

Regulators may respond to each of these levels of restrictions. Regulators may (1) require adequate corporate risk management systems to address managerial information endowment; or (2) impose enforcement mechanisms to address the credibility of risk reporting. While these measures apply to both voluntary and mandatory disclosure, regulators may (3) mandate risk reporting. The proceeding sections will investigate how these attempts relate to incentives for verified and unverified risk reporting. Although the analytic models only provide limited assistance in reasoning specific disclosure rules (Verrecchia, 2004; Wagenhofer, 2004), I will eventually discuss their implications for particular risk reporting rules.

4.2. Endowment of risk information

Managerial endowment of risk information by risk management systems determines the maximal information content of risk reporting. While there are various incentives to set up effective risk management systems (e.g., Shin, 1994), models featuring uncertainty of information availability provide an innovative framework to analyze their link to risk reporting.

Adopting basic models on uncertainty of information endowment allows us to interpret the probability that a manager is informed as a measure for the quality of his risk information and control system. As this probability rises, margins for withholding unfavorable information

narrow when considering verified disclosure (Jung & Kwon, 1988). This does not hold for non-verifiable information that may be misrepresented as shown in cheap talk models. Contrary to prior notions (Solomon et al., 2000), more precise risk information endowed does not necessarily lead to more or more precise risk reporting, irrespective of whether considering verifiable or credible non-verifiable information (Penno, 1996, 1997; Fischer & Stocken, 2001; Richardson, 2001). Although there are exemptions even apart from disclosure cost and specific agency problems, the models imply as a general rule that a better informed manager is more likely to disclose if outsiders can imperfectly assess his information status. This is consistent with findings of experimental studies such as King and Wallin (1996).

Regulators may exploit this link and address managerial risk information endowment by requiring adequate information and control systems as is the case under the Sarbanes–Oxley Act in the U.S. and the German Companies Act (Dobler, 2004). Along the lines of models on uncertainty of information availability, such regulation can be seen as imposing a minimum probability that a manager is informed. Assuming adequate enforcement, this minimum probability is reliably known by the outsiders and may provide a benchmark for the manager's flexibility in withholding the risk information gathered. While different types of risk factors and risks may relate to different probabilities of information endowment, any minimum probability below the level being required allows for withholding sufficiently unfavorable risk information. This implies that the most unfavorable information will not be disclosed even when available to the manager, thereby challenging the early-warning function of risk reporting.

4.3. Enforcement of risk reporting

Enforcement relates to both voluntary and mandatory risk reporting. While enforcement of voluntary risk reporting refers to truthful and credible disclosure, it also covers compliance with disclosure requirements in a mandatory disclosure regime addressed in Sections 4.4 and 4.5.

Since discretionary disclosure models assume verified disclosure, they allow considering a setting in which verifiable information can be disclosed as verified at some cost, e.g., cost of an audit. Models then imply withholding of sufficiently unfavorable risk information unless there is an exogenous duty to disclose the information verified (Verrecchia, 2001; Jorgensen & Kirschenheiter, 2003). That is, withholding private risk information can be a substitute for unverified disclosure (Wagenhofer, 2000). Imposing mandatory costly verification suggests ambiguous effects. The proportion of verified and thus credible risk reporting may increase, while some unverified information, that might be informative, will be withheld.

Non-verifiable risk information implies that the cost of verification is infinitely high and can only be disclosed unverified. This establishes the issue of credibility, particularly inherent in risk forecasts which are often regarded as the most useful information for users of financial reports (AICPA, 1994; ICAEW, 2002; IASB, 2005). While empirical research documents capital-market reaction on published forecasts (Lev & Penman, 1990; Clement, Frankel, & Miller, 2003), it is not clear whether this response arises from credible disclosure, naïve heuristics, or from other factors.⁸ Cheap talk settings imply that credible disclosure is

⁸ This advises caution to empirical studies which tend to draw inferences from risk reporting quantity to its quality (Botosan, 2004). Including a risk forecast in a risk report *ceteris paribus* increases disclosure quantity, while the quality of incremental disclosure is difficult to assess.

possible, but is linked to restrictive conditions. Relying on noise to impose credible disclosure, single-period cheap talk models yield boilerplate disclosures in the limiting case and imply that a manager may not (fully) disclose his private information simply because he cannot do so credibly. In contrast, multi-period cheap talk models as well as parts of the regulatory or empirical literature including Arnold and Hope (1974), Lev and Penman (1990) and Schrand and Elliott (1998), rely on nominal/actual value comparisons *ex post* to assess forecast credibility. This approach uses deviations between forecasted and realized values to assess past forecast bias and to anticipate future deviations (Rogers & Stocken, 2005).

In doing so, the approach faces two major problems. First, it addresses forecast accuracy *ex post* rather than forecast credibility, which is an *ex ante* concept. It is inappropriate to assess whether or not a forecast reflects managerial private information. This is because a deviation detected *ex post* can follow from intentional bias or from other factors impacting the forecast arguments. Vice versa, detecting no deviation does not allow concluding that a forecast reflects managerial private information (McDonald, 1973). Additionally, there are problems extrapolating past deviations into the future, particularly if data for a sufficiently long period of time are unavailable. Stocken (2000) considers this by requiring a minimum length of review phases in his reputation-based setting.⁴ Yet, the nominal/actual value comparison *ex post* does not allow assessing future forecast credibility. The mechanism, thus, appears to be heuristic.

Second and more particular to risk forecasts, even if a user was interested in assessing accuracy, there are technical problems in conducting the nominal/actual value comparison. Interval or noisy forecasts, as featured by cheap talk models require determining the nominal value. In the limiting cases, it might be a single value like the mode or the expected value in a range forecast, or the range itself. The choice of the nominal value is likely to affect the likelihood and the size of *ex post* deviations. Specifically, suppose a manager states that a threshold amount of future cash flows will be reached or exceeded with a positive probability below one. In turn, this implies that future cash flows are expected to fall below the threshold with the positive, complementary probability. Neither realization directly allows for assessing the accuracy of this forecast. On the other hand, the actual value, e.g., of cash flows from a certain project, may be subject to managerial discretion. If it is neither publicly observable nor disclosed by the manager, the comparison cannot be conducted. Even if an actual value is disclosed, earnings management research implies that managers bias reported numbers towards the forecasted values (Dutta & Gigler, 2002; Matsumoto, 2002). Thus, there is room and incentives for *ex post* manipulation to avoid unfavorable deviations and, in turn, this highlights the importance of enforcement of accounting rules. The disclosure of the variance of future cash flows as formalized by Jørgensen and Kirschenheiter (2000, 2003) provides an example for a setting in which the actual value is unavailable. The only *ex post* assessment may be an indirect one. Similar to the above example, it requires calculating a confidence interval using the forecast, i.e., since the expected value and the variance are disclosed, a range of nominal values can be created.

⁴ For further reputation considerations outside the scope of cheap talk models see Mahon and Wartuck (2003) and Rogers and Stocken (2005).

If the realized cash flow falls within the confidence interval, this can be seen as an indirect confirmation of the accuracy of the forecasted variance. However, such assessments remain vague and depend on the choice of confidence intervals. In conclusion, the results suggest considerable limitations of the use of nominal/actual value comparisons.

Regulation can impose audit and threats of litigation to contribute to credibility. Some forms of enforcement system is in place for financial reporting in virtually all countries and put cost on managers whose disclosures are classified as misrepresentations (Ijiri, 1975; McConomy, 1998). While enforcement is inherently imperfect for large parts of risk reporting, due to inherent discretion, it is of interest whether and how far regulatory enforcement can further risk forecast credibility. Considering an audit as a nominal actual value comparison it may apply *ex post* as discussed above or *ex ante*, comparing the private information against the forecast. Strict and tort liability builds upon these audits.

While possibly useful as a costly signal to users, the audit of a forecast (at an *ex ante* stage) technically lacks an observable nominal value. Given this limitation it has to revert to an assessment of the adequacy, completeness, and consistency of forecast arguments and methods. In consequence, it reduces to a test of plausibility eager to detect an arbitrary or strongly biased forecast (Dev, 1973; Dobler, 2004).¹⁰ Since including an auditor may yield dependence and further agency problems, even this limited contribution to forecast credibility can be eroded (Carmichael, 1973; Ewert, 2004). Particularly, an auditor is unlikely to enforce the disclosure of unfavorable risk forecasts if he is threatened to be replaced by another auditor or by self-fulfilling prophecies, both of which impair his quasi rents (Tucker & Matsumura, 1998). This implies that the disclosure of unfavorable risk forecasts is unlikely to be well-enforced, thereby supplementing a manager's incentives to withhold, misrepresent or bias as shown in cheap talk models.

Liability systems differ in their assessment of misreporting. Tort liability requires default on the part of the manager, which can be seen as a disclosed forecast misrepresenting his private information. This technically equals having an audit. Since the assessment of a forecast remains vague, tort liability has two adverse effects (Ronen & Yaari, 2001). It can prevent managers from releasing their private forecast information because its truthful disclosure might be assessed as a misrepresentation (first-order error). And it cannot fully prevent untruthful forecast disclosure because misrepresentations are not detected with certainty (second-order error). Apart from default, strict liability punishes a manager as misrepresenting if the forecast is not realized. Given the above critique, this mechanism is inadequate to contribute to risk forecast credibility. Consistent with empirical evidence (Bamber & Cheon, 1998; Healy & Palepu, 2001), strict liability imposes incentives to disclose noisy risk forecasts in order to reduce the likelihood of *ex post* deviations. In either system, fully revealing private information is not necessarily a manager's dominant strategy to prevent or reduce expected litigation cost.

In conclusion, regulatory enforcement cannot significantly contribute to risk forecast credibility as imposed by market mechanisms, but may give rise to adverse disclosure incentives. While managers may try to exploit heuristics as well as signaling and reputation effects to lend credibility to risk forecasts, the issue of credibility reaffirms most standard-setters (apart from the German) not to mandate risk forecasts.

¹⁰ For a related discussion of Value at Risk-disclosures see Woods, Dowd, and Humphrey (2008)

4.4. Mandating risk reporting

Even in the presence of regulation on risk information endowment and enforcement, a voluntary risk reporting regime that relies purely on disclosure incentives tends to yield poor risk reports. Given restricted disclosure in practice, academic literature has recommended that mandatory risk reporting be imposed (Schrand & Elliott, 1998; Lajili & Zéghal, 2005a). Several models, including Jorgensen and Kirschenheiter (2000), imply that strictly mandatory risk reporting might encourage more effective risk monitoring, thereby potentially yielding more effective risk management as assumed by Linsley and Shrives (2000) and Jorion (2002). In the limiting cases, however, mandating risk reporting will have little or no effect either if there are sufficient incentives to disclose voluntarily, or if it is not or cannot be well-enforced. The reasons for mandating risk reporting still depend on the costs of preparers and the benefits to users.

Concerning both verifiable and non-verifiable information, opponents to mandatory risk reporting raise concerns of disclosure cost. While risk reporting can be associated with direct and indirect cost (Abdel-khalik, Gaul, & Newton, 1986; FASB, 2001), the concern must be analyzed on two fronts. First, assuming that costs of risk reporting arise with certainty, like direct cost of preparing, auditing, and publishing risk reports, the models discussed imply that mandatory risk disclosure harms those entities that withhold risk information in a voluntary disclosure regime. Particularly, and contrary to the common view (ICAEW, 1999; Solomon et al., 2000), Jorgensen and Kirschenheiter (2003) show that an entity's cost of capital will weakly increase if disclosure of firm-specific variances of future cash flows becomes mandatory. While this suggests why managers may oppose mandatory risk reporting, restricted voluntary risk reporting per se does not necessarily recommend mandatory risk reporting from a regulator's point of view. This specifically applies if regulation focuses on maintaining resources and protecting entities and their current shareholders. However, considering the information function assigned to risk reporting mitigates this assessment.

Second, opponents pretend the threat of self-fulfilling prophecies, which particularly concern risk forecasts as non-verifiable information (Boritz, 1991; Baetge & Schulze, 1998; Solomon et al., 2000) is real. The argument is based on Thomas' theorem: "If men define situations as real, they are real in their consequences" (op. cit. Merton, 1948, 193). Opponents claim that risk reporting would induce reactions by outsiders that cause the realization of the risk disclosed. Considering only downside risk, disclosure is associated with unfavorable outcomes harming the disclosing entity, i.e., with indirect disclosure cost. However, the self-fulfilling prophecy argument is speculative. Risk reporting cannot define future situations as real, unless it is misinterpreted. As the cost arising is not known, models featuring disclosure cost do not apply without qualification. Moreover, there is little empirical evidence consistent with self-fulfilling risk reports. Referring to going-concern disclosures, empirical audit research rather documents the nonexistence of, but a strong belief in self-fulfilling prophecies (Mutchler, 1984; Louwers, Messina, & Richard, 1999; Citron & Taffler, 2001). It appears that the fear of self-fulfilling risk reports combined with other managerial incentives to withhold information drives managers to oppose mandatory risk reporting. This result suggests neglecting the self-fulfilling prophecy argument when weighing costs and benefits in regulatory decisions. If a mandatory risk reporting regime is imposed, the result specifically supports arguments put forward to oppose opt-out clauses, such as IAS 37.92 (Linsley &

Shrives, 2000; ICAEW, 2002). Once imposed, a permissive application of opt-out clauses might lead to similar disclosures observed under a voluntary reporting regime. This challenges the information and particularly the early-warning function of risk reporting and finally the aim of risk reporting regulation. When weighting costs and benefits to decide on mandatory disclosures, the nature of risk information suggests that mandating risk disclosure may not be too harmful for preparers given the inherent discretion. This discretion is likely to allow managers disclosing private risk information in a less crucial way thereby, however, impacting the information content of risk reporting.

4.5. Specific risk reporting requirements

While formalizing general types of risk disclosures providing verified or unverified information on the distribution of future outcomes, the analytic models yield some specific implications for risk reporting requirements. These relate to disclosure incentives that the models indicate or neglect and which can be exploited by regulation.

Considering verified risk reporting, uncertainty of information availability yields at least three important implications. First, models of this strand rely on the impossibility of credibly disclosing not to hold risk information of a certain type. However, consistent with empirical evidence (e.g., Kajüter & Winkler, 2003; Kajüter & Esser, 2007), there are incentives to disclose this fact to mitigate doubt among outsiders and benefit from a higher firm valuation. Regulation could exploit this mechanism and mandate negative reports indicating that a manager is not informed about a risk of a certain type or extent. If such negative reports are credibly disclosed, full disclosure will be obtained under the unraveling principle. To date, neither the U.S., nor the IFRSs, nor Germany requires negative reports.

Second, and in a similar vein, disclosures on risk monitoring and management systems can help outsiders assess the probability that a manager is informed. While there are incentives to disclose such information for the sake of higher firm valuation, as shown by Shin (1994), they are eager to benchmark the room for managerial discretion. This reaffirms both prior literature generally assuming risk management disclosures to be useful for outsiders (Beretta & Bozzolan, 2004; Lajili & Zéghal, 2005b) and their compulsory disclosure (SFAS 133.44–45; IFRS 7.31–32; GAS 5.28–29).

Third, and more generally, the herd effects documented by Dye and Sridhar (1995) rely on comparable risks reported in a comparable format among entities. Exploiting herd effects suggests requiring formalized rules on risk categorization, quantification, and disclosure format as opposed to following a pure management approach. This relates to comparability of financial reporting in general (IASB F.39–41; CON 2.111–119) and reaffirms prior literature recommending more formalized risk reporting rules (Schrand & Elliott, 1998; Lajili & Zéghal, 2005a). Given recent regulation, this comparability is likely to be obtained to some degree for risk disclosures in the notes but not in management reports.

A final implication concerns the credibility of risk forecasts. It has long been argued that providing supplemental disclosures on forecast arguments and methods further forecast credibility (Dev, 1973; Mallinson, 1974). As such disclosures are partly verifiable, this reasoning substantiates along the lines of both an audit and nominal actual value comparisons ex post as formalized in multi-period cheap talk models. Ex ante, supplemental disclosures can help outsiders to assess the distribution of future cash flows using verifiable

disclosure and to evaluate the plausibility of a risk forecast disclosed. Since these disclosures partially commit a manager to a certain way to meet the risk forecast, they reduce the discretion to manage ex post outcomes. Consistent with recent empirical findings, both are eager to prevent arbitrary risk forecasts (Hutton, Miller, & Skinner, 2003; Baginski, Hassell, & Kimbrough, 2004).¹¹ While most reporting regimes do not require risk forecasts, supplemental disclosures are merely encouraged (AICPA, 1994; IASB, 2005). A notable exception is Germany, where both risk forecasts and supplemental disclosures are compulsory (GAS 5.9–10, .18, GAS 15.83–91).

Yet, given discretion even in the presence of rather strict risk reporting rules and particularly when considering risk forecasts, neither regulation is eager to overcome the role of incentives in risk reporting. This implies that we should not overestimate the information and particularly the early-warning function of risk reporting.

5. Conclusion

In this paper, I review discretionary disclosure and cheap talk models to assess risk reporting incentives and their relation to regulatory attempts. While largely neglected in risk reporting literature so far, these disclosure models can be motivated by a risk management perspective, which acknowledges the imperfection of risk information and discretion in its disclosure. The approach chosen covers verified and unverified risk reporting by referring to discretionary disclosure and cheap talk models, respectively, as well as the probabilistic nature of risk reporting, by referring to the distribution of future cash flows or parameters of it. Considering risk reporting as an endogenous feature, this approach provides a benchmark for assessing exogenous regulatory attempts and, thus, an analytically-based framework for discussion.

My results imply that incentives for risk reporting are less prevalent than partly suggested by the extant literature and can explain limited risk reporting as documented by empirical studies even in regulated regimes. First, a manager may not report because he has no risk information or pretends not to have any. Requiring adequate risk management can benchmark but cannot eliminate the room for managerial discretion, while more precise risk information endowed does not necessarily lead to more precise risk reporting. Second, a manager may not report non-verifiable risk information available because he cannot credibly do so or chooses to misreport. Audit and liability can have limited use to further risk reporting credibility, but may impose adverse disclosure incentives as well. Third and partly consistent with prior assertions, a manager may withhold risk information available due to threats of commercial drawback, i.e. cost. Although cost can be the key to credible but noisy disclosure of non-verifiable risk information, mandating risk disclosure can have unfavorable effects for the firm and the economy. Findings also suggest the use of negative reports on certain risks, disclosures on corporate risk management, comparable and formalized reporting formats, and supplemental disclosures on risk forecasts, which are only partly considered by current regulation.

¹¹ Hirst, Koonce, and Venkataraman (2007) provide evidence that disaggregating forecasts works in a similar vein. Considering risk forecasts in particular, this is consistent with risk analysis approaches based on Hertz (1964) and Mallinson (1974).

My overall results have major implications for empirical research. Most noteworthy, they yield testable hypotheses on the association of determinants of risk reporting and (1) risk exposure; (2) risk information endowment; (3) enforcement mechanisms; (4) mandating disclosure; (5) imposing comparable disclosure requirements among firms; (6) supplemental disclosures on risk forecasts. Further, the findings may explain why disclosure precision may not increase or why cost of capital may not decrease when extending risk reporting requirements.

In conclusion, the implications of this study should be interpreted in the framework applied and as *one* first approach to assess incentives for risk reporting. Given this framework, analytic findings are subject to the underlying assumptions, covering neither all facets of risk-related disclosures nor all incentives for risk reporting. As suggested by Linsley and Shrivs (2000), other approaches include agency, legitimacy, political cost, and signaling theory. These theories might alter, support, or supplement the implications of this study, leaving risk reporting a fertile area not only for empirical but also for conceptual and analytical research.

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Book Review Section

The book review section is interested in works published in any language, as long as they are comparative or international in character. The author or publisher of such works should furnish the book review editor with two (2) copies of the work, including information about its price and the address where readers may write for copies. Reviews will be assigned by the book review editor. No unsolicited reviews will be accepted. Suggestions of works that might be reviewed are welcomed.

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Book reviews

Financial reporting and global capital markets — A history of the International Accounting Standards Committee, 1973–2000, Kees Camfferman, Stephen A. Zeff (Eds.), Oxford University Press, Oxford, UK (2007). xxiii + 676 pages, £75.00, \$140.00, €107.45, ISBN: 978-0-19-929629-3

This book traces the history of the IASC. According to the Foreword by Sir David Tweedie, it “was conceived at IASC’s farewell dinner in December 2000” (p. xvii) and “will be the definitive history of the IASC from its inception to its transformation from a part-time to a full-time organization” (p. xvii).

The authors’ aim is “to tell the story of the formation and evolution of the IASC from 1973 to 2000” (p. 2). This story is not told in a strictly chronological fashion. Instead, there is a focus on three main aspects: the IASC’s standards, the individuals involved in its work, and external, economic, regulatory or political influences on the IASC and its role. Thus the emphasis is on the development of the IASC and its technical output as well as on the causes and effects behind its progress, its political dimensions, and the motivations of the individuals involved.

The authors’ methods consist of archival research and interviews. Sources were IASC documents from the IASB’s archives, documents made available by individuals, and archival material of other accounting associations, most notably those of the Koninklijk Nederlands Instituut van Registeraccountants, Amsterdam, the Institute of Chartered Accountants of Scotland, the Institute of Chartered Accountants of England and Wales, and the Canadian Institute of Chartered Accountants. The authors were also able to draw on published sources in a number of languages, as well as translations from languages they were unable to access personally. In addition, they conducted more than 135 interviews with former IASC board members, members of committees and working parties, support staff and individuals who came into contact with the IASC through their work for regulatory authorities, stock exchanges, the World Bank, IFAC, FEE, and UEC (Union Européenne des Experts Comptables, Economiques et Financiers).

The book will be relevant to anybody interested in international accounting. As the authors suggest, an understanding of the IASC’s history and work aid in understanding the IASB’s processes, role, and output, as well as problems facing the IASB. The book is meticulously researched and contains a wealth of detailed background information not previously in the public domain. As such it provides a welcome reference source for researchers, who will also benefit from the frequent citations of sources and reference materials. The amount of detail provided can occasionally make it hard to follow the story lines. The authors’ solution to this problem is to dedicate certain chapters to descriptions of factual information, such as, for

example, the structure and financing of the IASC or information referring to officials (for example in sections 4.1 or 8.1) or delegations. Other chapters are almost entirely dedicated to the IASC's technical output, and yet others follow the development of the Committee by exploring its political influences and challenges. This is particularly well done in Chapter 13. While most readers will be familiar with the outline of the IASC's history – in particular the somewhat dramatic developments of its final years – there is still room for surprise in learning more about the underlying influences and roles played by individuals and about political influences within and outside the Committee, about the vested interests represented in the negotiations and the compromises forced.

The book has three parts and 13 chapters. Additional detail, such as lists of chairmen and senior staff, of members of the delegations to the IASC, of IASC technical output, and of the individuals interviewed by the authors, is provided in seven appendices. Six tables throughout the text list inter alia IASC membership, revenue and expenses, standards revised during the Comparability and Improvements projects, and the Core Standards work program. There are further 20 photographs, mainly of prominent IASC functionaries, of delegates and of IASC staff throughout the years.

Chapter 1 provides an Introduction and Overview (synopsis). Part I (Chapters 2 and 3) covers the developments leading to the creation of the IASC, and the foundation itself in 1973. It begins by examining the economic and political factors which emerged in the 1950s and 1960s and which contributed to the IASC's creation. This part examines the significance of the Accountants International Study Group (AISG), created in 1966, which the authors see as a "lineal predecessor" (p. 22) of the IASC, and the role and influence of Sir (later Lord) Henry Benson, who initiated the foundation of both the AISG and the IASC, and was the first chairman of the latter. We are then introduced to the newly founded body's objectives, processes, and financing, as well as the motivations of key players and initial reactions by and relationships with other organizations. Membership represented accountancy bodies from Australia, Canada, France, Germany, Japan, Mexico, the Netherlands, the U.K. and Ireland and the U.S., with other bodies joining as associate members, but excluded from full membership.

Part II (Chapters 4–7) covers the period from 1973 to 1987. It focuses on the individuals involved in the IASC's early history and on its structure (Chapter 4); on the early standards (Chapter 5); on the IASC's efforts in gaining international recognition (Chapter 6); and on its political environment (Chapter 7). It soon emerged that the IASC faced a number of problems. Its first standards were relatively basic and contained many options (Chapter 5 is aptly titled "Compromise to Harmonise"), although the authors take issue with the allegation that the IASC was aiming for the "lowest common denominator" (p. 142). Instead, the examination of the development of the early standards shows they eliminated undesirable but not uncommon practices. However, as explored in Chapter 6, compliance was a problem; member bodies were unable or unwilling to enforce their use, and the standards were more successful in the countries represented by some of the IASC's associate members than by the full members. Chapter 7 examines challenges to the IASC's exclusivity, which was gradually relaxed, in terms of countries and organizations represented. On the one hand, the IASC was subject to pressures to merge with IFAC, on the other hand its authority was challenged because it represented only accounting associations and not financial-statement preparers and users. Its Constitution was revised in

1982, and a closer link with the IFAC was established. The IASC now had 13 seats on the standard-setting board for accounting associations and four for other organizations. In addition, in 1981 a Consultative Group was created, which represented further organizations with an interest in harmonization. According to the authors (p. 9), "[t]hese changes were sufficient to free the IASC from significant pressure from IFAC, the UN, and the OECD, but not sufficient to ensure widespread compliance with its standards."

Improving the standards and convincing accountants and regulators of their quality was therefore the next challenge. These issues are addressed in Part III (Chapters 8–13), which covers the period from 1987 to 2000. It examines further changes in terms of individuals involved, structure and funding (Chapter 8); the development of the Framework and the Comparability and Improvements Projects (Chapter 9); negotiations with IOSCO and the SEC (Chapter 10); the Core Standards Project (Chapter 11); reactions and gradual acceptance within and outside Europe (Chapter 12); and finally, the restructuring (Chapter 13). In 1987 IOSCO agreed that, if the quality of the IASC's standards could be sufficiently improved, IOSCO would consider endorsing the standards. That meant it would recommend to its member bodies to accept financial statements prepared on the basis of IASC standards. However, the IASC's first initiatives – the Framework Project and the Comparability Project (which aimed to reduce the number of options) were not sufficient to satisfy IOSCO, nor was the Improvements Project – a major revision of 10 standards, completed by 1993. While Chapter 9 is dedicated to the technical content of these projects, Chapter 10 provides a useful exploration of the IASC's political struggles to win the endorsement of its standards by IOSCO and the SEC.

The remaining chapters cover well the increasingly dramatic developments leading up to the restructuring. They show how, in spite of the failure to win IOSCO's approval, the IASC's standards had begun to obtain greater international recognition, not only by leading continental European companies, but also by the European Commission, which was beginning to consider an alternative strategy to its company-law directives. After further changes to its operations, procedures, funding, and board membership and after the further improvement of ten key standards, the "Core Standards" project (the technical aspects of which are explored in Chapter 11), a limited endorsement by IOSCO was finally achieved in 2000, but without effecting any change in the SEC's position, which still demanded a reconciliation to U.S. GAAP. The book illustrates well how the IASC's due processes and structure became the major focus of debates between the IASC, IOSCO, the G4 and, increasingly, the SEC, which favoured a model based on the FASB – against the wishes of the European Commission and of governments of non-G4 members. Eventually, recognizing the need for SEC support, the IASC accepted a "non-negotiable recommendation" by the SEC on a new structure, leading to the replacement of the IASC by its successor, the IASB in 2001. As is well known, shortly afterwards the EU made the new IASB's standards central to its financial-reporting requirements.

The authors acknowledge a number of limitations. One of these was lack of access to IOSCO resources not on public record, a lack of understanding of all national backgrounds of IASC participants, as well as linguistic limitations. The latter meant that they were better able to understand and assess the roles of actors and influences from English-speaking countries, France, The Netherlands and Germany, than from other countries. Further, the authors acknowledge that the book's main focus is on perspectives from the U.K. and U.S.

because these countries provided the richest sources and because they were of "primary importance" (p. 3).

The authors were commissioned to research and write this book by the IASB, but were given complete editorial freedom. Their enthusiasm for the IASC is apparent and acknowledged. Other researchers, if they have access to suitable resources and language skills, may wish to examine more closely the influence of and impact on other constituents, or may wish to take a less descriptive and more critical focus in assessing the history and politics of the IASC. However, this would require a work with less emphasis on comprehensive coverage. Given the constraints implicit in the authors' stated intentions, underlying assumptions and limitations, this is a valuable and interesting book indeed and achieves its aim well.

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Joseph F. Hair, Arthur H. Money, Mike Page, & Phillip Samouel (Eds.), *Research Methods for Business*, John Wiley & Sons, West Sussex, England (2007), 448 pages, £31.99, €48.00, \$66.41, ISBN: 978-0-470-03404-0

The authors offer this text distinguished by its framework, the managerial decision-making context, as a practical alternative to more established textbooks on business research methods. The book uses a relatively simplistic threaded case, applied consistently and repeatedly throughout to demonstrate key concepts and techniques that would emphasize the author's underlying intent of making legitimate research a reachable foundation for all business decision makers. Recognizing that corporate failures are often linked to executives' misguided behavior, they present ethics early on (chapter 3) shortly after presenting the history of, and current trends in, applied research in the introductory chapter. The importance they place on ethics is reinforced in every chapter by way of explicit discussion of relevant issues and/or ethical dilemmas for students to reconcile. Technology is also recognized via inclusion of Internet exercises (*URLs* provided) that typically require visiting websites and downloading reports or datasets, and by inclusion of frequent *SPSS*-generated "how to" inserts in the chapters (11 through 14) pertaining to data collection, review, and analysis.

Content-wise, the text is organized using the standard approach: research design, sampling and data collection, data analysis, interpretation of results, and communication of results. While all appropriate terminology is utilized (and accurately defined in the *Glossary*), explanations in simpler everyday language and business terms are frequently used to help the reader understand what may be new and perhaps difficult statistical concepts. The

case that runs throughout the text, Samouel's and Gino's Restaurants, is simple enough to avoid confounding business-related issues—certainly a useful approach for undergraduate education. Some may find it too simplistic, however, for graduate and professional-level audiences, preferring all the environmental complexities that typically surround research processes in the business domain. The authors maintain a reasonable and consistent balance between technical discussion and practical application throughout, reducing any propensity for alienating readers or students who might lack in analysis/synthesis abilities or experience.

Section II, *Beginning the Research Process*, covers the continuing evolution of research methods, primarily driven by emerging data availability, technological capabilities, new business processes (for example, customer relationship management), and a frank discussion of theory versus business (practicality) and scientific methods versus business research. Chapter 2, *Overview of the Research Process*, emphasizes the need for scientific rigor despite the pragmatism of business. This is a critically important perspective; the availability of data, the dissemination of information, and the ease of executing software continually challenge the former. Chapter 3 presents strong arguments for ethical responsibility: social and market; organizational, professional, and individual; and decision maker, researcher, and participant. These perspectives are well organized using simple, direct lists, guidelines, and examples to facilitate clear understanding and expectations. Coverage of existing literature (in chapter 4) is excellent. The authors emphasize a process approach beginning with developing and expanding research possibilities through thorough familiarization with the most recent developments. The step-by-step summary (Exhibit 4-2 on page 97) is simple, comprehensive, and direct. The authors utilize this format repeatedly throughout; it is highly effective and precludes the clutter and complexity of "catch all" graphical depictions prevalent in some other business research texts.

Section III, *Research Design, Sampling and Data Collection*, begins with a clear and comprehensive process for collecting secondary data backed up by informative definitions, source-format-type breakdown (simply yet effectively depicted in Exhibit 5-1, p. 119), and lists of sources organized by URLs and their administrators. Chapter 6 addresses model conceptualization and definition including variables and constructs, hypotheses and relationships, and basic research designs, organized into a comparative table. Even readers with only a basic understanding of related statistical concepts will find these approaches to sampling accessible. Primary data issues (organized as qualitative or quantitative) are likewise handled effectively without drowning the reader in statistical jargon or theory. The presentation of measurement scales makes use of ample examples and emphasizes practical considerations when developing them. They explain reliability and validity, offer several useful summaries in table format, and confirm several indicators by way of SPSS-executed examples. Again, a step-by-step scale-development process anchors their treatment. The final chapter in this section, *Questionnaire Design*, provides business-related examples and is sensible in its discussion.

Typically, a challenging element of business research, especially for managers, is data analysis and interpretation. The authors incorporate frequent examples, usually accompanied by SPSS output and/or instructions. Maintaining segmentation by qualitative versus quantitative data, they proceed efficiently through the major approaches for each: phenomenology, ethnography, grounded theory, and case studies, for the former; and

descriptive statistics, frequency distributions and histograms, t-tests, analyses of variance, and regression analyses, for the latter. Organization by chapter includes appropriate procedural and statistical considerations interspersed with graphics, lists, and examples and continuing the threaded-case applications. In most cases, the knowledge gained from a legitimate business statistics course will suffice as background for using this book because the authors are especially adept at providing unambiguous and understandable explanations of some sophisticated, statistical procedures (for example, multivariate analysis of variance or multicollinearity). Beyond its process approach and logical order, this is a key strength of this text -- presenting statistical requirements for legitimate empirical research in ways that are understandable, unintimidating, and practical. A legitimate caution, of course, is whether or not the capability to execute such procedures may lead to inappropriate application.

The final section of the text presents useful guidelines for written and oral communication of results and recommendations. While not detailing specific instructions for creating graphs, tables, etc., in any particular software, it does provide extremely simple-to-understand-and-apply guidelines for technical writing, research proposals and reports, and oral presentations.

This text provides a functional, introductory treatment of research methods useful in business contexts for a wide audience including managers and researchers who have limited experience, perhaps new users of these techniques, or even more experienced professionals seeking to refresh their skills or learn new ones, as well as undergraduate students and graduate students in non specific programs (for example, MBA). While friendly to these audiences, the book does *not* provide the coverage of topics and depth of discussion necessary for more rigorous graduate studies or sophisticated technical research (for example, pharmaceutical). The extensive and/or explicit treatment of certain topics typically included in business research textbooks, such as design of experiments and non-parametric significance tests, are omitted. Maintaining accessibility for the audiences described above may explain these omissions. The authors reinforce applications with numerous calls for *Research in Action* throughout the text; many provide access information (URLs) for further exploration. *Review Questions*, *Discussion and Application Activities*, and *Internet Exercises* offer a wide array of introspective and application-oriented learning opportunities. An especially useful and unique aspect of this text is the *Chapter Summary*. Rather than simply restating key points from chapter material, summary paragraphs are organized by *Learning Outcomes* identified at the beginning of each chapter. This feature concisely closes the learning process for each chapter followed by the aforementioned array of supplemental activities assignments to confirm and extend learning outcomes.

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Behind closed doors — What company audit is really about, Vivien Beattie, Stella Fearnley, Richard Brandt Palgrave (2001), xxii + 309 pages, US\$105.00, £75.00, ISBN 0-333-74784-4

The title, "Behind closed doors — What company audit is really about," creates the expectation that this book will reveal insights not previously communicated to the public. And I think the book delivers enough to meet these expectations. In particular, the book presents a number of interesting stories about the interplay between auditors and clients as financial statements are about to be finalized. The book is likely to be of interest for both auditing students and academic scholars.

1. Organization of the book

The book is divided into three parts. Part one contains a review of the related literature for several topics including the demand for audits, audit quality, auditor independence, and corporate governance. The literature on economics-based theories of auditing, as well as studies based on marketing and psychology, are also reviewed. In fact, the authors address a broad research area in a limited number of pages and perhaps for that reason the ideas and the contributions of some of the articles discussed remain somewhat unclear. However, the literature review provides a good starting point for students and scholars who would like an overview of the auditing area. The insights provided herein can then be supplemented with a study of the articles in question and other reviews. The fact that the book only covers articles until the end of the 90s makes it even more important for readers to seek out supplemental material.

The first part of the book also includes a summary of the results from a questionnaire undertaken by the authors. The purpose of the questionnaire was to find out which issues related to the production and audit of financial statements were most frequently discussed by the auditor and the auditee. The chapter also includes results from a study of the frequency of accounting changes resulting from discussions and negotiations between the auditor and the auditee. Results from the questionnaire are presented in more detail in Beattie, Fearnley and Brandt (2000).

Part two of the book presents six case studies for which the audit-engagement partner (AEP) and the finance director (FD) were interviewed. These case studies occupy more than half the pages of the book and were selected based on the questionnaire previously mentioned. These results, are also presented in Beattie, Fearnley and Brandt (2004). In each case a number of "interactions" between the AEP and FD are described and analyzed. Most of these interactions are related to financial-reporting issues, including stock-obsolescence provisions, reorganization costs, useful lives of assets, leasing as well as accounting for assets on disposal and acquisition of businesses. Examples of other interactions studied are the changing role of the audit committee, negotiations over fees, and control problems.

The case studies demonstrate that there are numerous negotiations taking place between the AEP and the FD. Negotiations take place over financial-reporting issues, audit fees, going-concern problems, as well as a number of other issues. In most of the cases, the outcome turns out well but the authors also report evidence on cases in which the compliance with accounting rules was poor. For example, on pp. 103–107 the authors describe a case in which the inventory was over-valued and the agreement was to write off

the over-valuation over a three-year period instead of immediately. Consequently, the inventory was not stated at the lower of cost or net realizable value as required by accounting standards.

In light of the fact that the cases deal with sensitive issues, the respondents seem to have provided surprisingly detailed information on the issues studied. In most cases it is possible to get fairly good insights into what was really going on, but in some cases the readability is impaired by the complexity of the financial-reporting issues. In those cases more detailed information about the rules in accounting standards, as well as the proposed accounting treatments, would have been useful. The fact that U.K. standards were employed by the companies makes it even more difficult for readers from other countries to understand the accounting issues.

The third part of the book includes an analysis of the cases and conclusions. The authors use grounded theory as the starting point for their analyses. Grounded theory refers to the process of building theory inductively through a qualitative analysis of the data. The analysis ends in a classification of the interaction outcomes (e.g., financial-reporting matters) on the following two dimensions: the quality of the outcome and the ease of agreement. The interactions — issues of interest in the negotiations between the auditor and the firm — were then assigned to clusters ranging from a good outcome that was attained easily to a poor/creative-compliance outcome attained with some degree of difficulty. The over-valuation of the inventory, discussed above, is an example of an interaction assigned to the poor/creative-compliance category. The analysis also includes a classification of the audit-engagement partners into four categories ranging from so called “crusaders” to “trustees.” “Crusaders” are auditors who have an extremely high professional and personal integrity and “trustees” are characterized as having moderate professional integrity and who may unknowingly permit rules to be bent.

The final part of the book includes some policy implications, a few of which are radical. For example, the authors point out the potential harm to investors when small issues of poor-quality accounting do not come to their attention because these issues are deemed to be immaterial. The authors suggest two solutions for this: First, currently accepted materiality levels should be radically changed. Second, a lesser type of sanction than a qualified audit report should be introduced for less serious breaches (see p. 287). The authors also give some advice on the appropriate allocation of audit partners to clients in the final part of the book. For example, they point out that it is not a good idea to assign a young, inexperienced partner to a client where the FD is much older and the chief executive is dominant as it may put the partner in a weak bargaining position.

2. For whom is the book of potential interest?

The findings and conclusions are probably of some interest to practitioners, but I think the main reader categories are accounting/auditing students and scholars. The cases presented give students some insights into what auditing is really about at the manager/partner level. The cases can also serve as a starting point for students planning to write a case-based Master's thesis. Indeed, students might have problems accessing personnel at the AEP and FD level but, for example, studies of different issues related to the interplay between audit assistants and clients might be a fruitful area for them. The book is naturally of interest to

scholars who are planning to write case-based studies. Beattie, Fearnley and Brandt propose, at the end of the book, some areas for future work based on the grounded theory approach.

Most of the existing body of auditing research has its origins in economics, psychology, and other related areas. However, this book might also be of interest for scholars using economics-based and other approaches. This is likely to be the case particularly if one focuses on tests and applications of theories instead of theory development. Tufano (2001) points out that case-based research can have the following roles in addition to theory development: (i) to test theory, (ii) to apply theory in real-world settings, and (iii) to communicate theory.

Applications of economics-based theories on negotiations between auditors and clients could give new insights about the behavior of both parties. The authors describe several such situations in which economics-based theories could contribute to the explanations about the behavior of auditors and clients: The TJ plc case, for example, describes the relationship between the AEP and the FD in a small family-controlled company. The company had experienced a loss of market share, a reduction in profitability, and it was eventually sold (pp. 82–114). The relationship between the audit-engagement partner and the financial director is characterized in the book as weak and the chief financial officer is a “grudger.” (A “grudger” sees little value in the audit, is unhelpful and a cost minimizer.) However, it is possible that the behavior of the FD and chairman was totally in line with economics-based reasoning. One could assume that a clean audit report was very important, but at the same time the management wanted to maximize their possibilities to use aggressive accounting policies until the company was sold.

To conclude, I think the book can serve as stimuli for case-based research for scholars with different methodological backgrounds.

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Books

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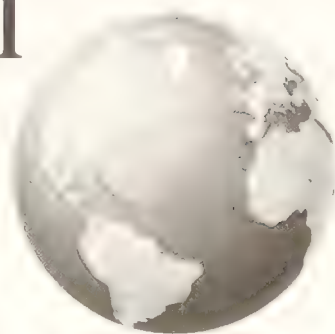
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The effect of globalization and legal environment on voluntary disclosure

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Abstract

We examine how interactions with foreign capital, product, and labor markets affect the disclosure practices of non-U.S. multinational firms. Drawing on literature related to multinationals, country-level legal institutions, and accounting disclosures, we expect that the relation between globalization and voluntary disclosure will be conditioned by the legal environment in a firm's home country. Specifically, while firms from countries with a strong legal environment (e.g., common-law countries) already face pressure for good disclosure, globalization can increase the benefits associated with good disclosure to firms from weak legal environments (e.g., civil-law countries). We use a self-constructed voluntary disclosure index and hand-collected disclosure and foreign activity data for 643 non-U.S. firms from 30 countries for 2003. We find a significant interaction between globalization and the legal environment. This indicates that for the same level of globalization, there is more voluntary disclosure for firms based in weak legal environments. Our results suggest that globalization is an important variable that has been overlooked in much of the previous cross-country research.

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Keywords: Voluntary disclosure; Globalization; Legal environment

1. Introduction

There is an expanding literature that examines whether a country's legal and judicial institutions affect disclosures and other accounting properties across countries (e.g., Ball,

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Kothari, & Robin, 2000; Jaggi & Low, 2000; Hung, 2001; Ball, Robin, & Wu, 2003; Hope, 2003a, 2003b; Bushman, Piotroski, & Smith, 2004; Bushman & Piotroski, 2006). However, for the most part, these studies do not consider the role of globalization; i.e., they ignore the fact that many firms operate and raise funds in multiple countries. At the same time, a few studies (e.g., Gray, Meek, & Roberts, 1995; Cahan, Rahman, & Perera, 2005) find that voluntary disclosures increase with globalization, but these studies do not control for the fact that multinational firms operate in countries with different legal environments. This study provides the missing link by exploring the relationship between globalization and the legal environment as it relates to disclosure.

Specifically, we examine how a firm's voluntary disclosures are affected by its degree of international diversification and by the legal environment in its home country. We argue that globalization creates a demand for voluntary disclosure because multinational firms are likely to have greater information asymmetry as a result of their greater scope and complexity. However, in addition to increases in voluntary disclosures resulting from globalization, we expect that the effect will be larger for firms based in countries with weak legal environments than for firms based in countries with strong legal environments. That is, we expect that the former will provide more disclosures as a result of their weak legal and judicial institutions at home. Using a sample of 643 non-U.S. firms from 30 countries, a self-constructed index of voluntary disclosure, and hand-collected disclosure and foreign activity data, we find evidence that is consistent with our expectations—that the interaction between globalization and the legal environment is significantly associated with voluntary disclosures.

Our study contributes to several areas of research. First, we contribute to an emerging line of research that examines the accounting consequences of foreign firms interacting with the United States markets. For example, Lang, Raedy, and Yetman (2003) find that non-U.S. firms that are cross-listed in the U.S. have earnings properties that are more like U.S. firms compared to other firms in their home countries; Bradshaw, Bushee, and Miller (2004) find a positive relation between U.S. GAAP conformity of non-U.S. firms and ownership by U.S. institutions; and Khanna, Palepu, and Srinivasan (2004) find that non-U.S. firms are more likely to use U.S. disclosure practices as involvement with U.S. markets increases. Since we do not limit our tests to interactions with U.S. markets, we provide more general evidence on the effects of interacting with foreign markets.

Second, we add to the growing literature that uses country-level institutional features, such as legal origin or investor protection, to explain cross-country differences in accounting properties. For example, Jaggi and Low (2000), Hope (2003b), and Francis, Khurana, and Pereira (2005) find that country-level institutional factors matter in explaining disclosure levels. Further, Leuz, Nanda, and Wysocki (2003) find that earnings management is related to a country's investor protection. Ball et al., (2000) find that the accounting properties of timeliness and conservatism vary between common-law and civil-law countries. Ball et al. (2003) find that country-level institutional factors can dominate accounting standards, and Hope (2003a) finds that a measure of legal enforcement is related to analysts' forecast accuracy. However, none of the prior studies have considered how globalization affects their results. We suggest that globalization may be an omitted variable in these tests.

Third, we contribute to the voluntary disclosure literature. Most prior international studies have used the CFIAR scores or, more recently, the transparency and disclosure index developed by S&P. However, as Bushee (2004) suggests, these indexes are not without

problems, and he notes that “the biggest payoff to future researchers will likely come to those who construct their own disclosure indexes” (p. 524) and use hand-collected data. We use a voluntary disclosure index based on Francis, Nanda, and Olsson (2008) and hand-collect disclosure data for 643 firms from 30 countries. This allows us to provide more powerful tests of firm-specific disclosure incentives and allows us to complement prior studies that use broad-based, externally developed disclosure indexes.¹

Fourth, we contribute to the literature on globalization and multinational firms. Most of this research focuses on U.S. multinationals. For example, Duru and Reeb (2002) find that in the U.S. analysts’ forecast accuracy is inversely related to globalization. Callen, Hope, and Segal (2005) find that for U.S. multinationals, the variance of unexpected stock returns is related more closely to domestic earnings than foreign earnings. One reason why prior studies have not considered the effects of globalization for non-U.S. firms is that foreign-activity data for non-U.S. firms are not widely available on databases like Compustat Global. Here, we augment data from Compustat with hand-collected data on foreign activity. Thus, we are able to examine the effects of globalization for a large, diverse sample of non-U.S. firms.

The remainder of the paper is organized as follows. Section 2 provides a brief literature review. Section 3 develops hypotheses. Section 4 describes the sample, model and variables used in the study. Section 5 provides descriptive statistics and discusses the results of the empirical tests. Section 6 is the conclusion.

2. Literature review

Several recent studies examine interactions with U.S. markets. Lang et al. (2003) examine the accounting properties of non-U.S. firms that are listed in the United States compared to firms that are not cross-listed; they find cross-listed firms are less likely to manage earnings and are more likely to have earnings that are timely and conservative. Their results also indicate that some of the differences arise in the post cross-listing period. Bradshaw et al. (2004) examine whether conformity with U.S. GAAP affects the level of U.S. institutional ownership for non-U.S. firms. They rate U.S. GAAP conformity by examining 13 accounting-method choices and find that greater levels (changes) of U.S. GAAP conformity are related to greater U.S. institutional ownership.

Khanna et al. (2004) argue that non-U.S. firms with more involvement in U.S. capital, product, and labor markets will adopt U.S. disclosure practices. They use a variety of firm-level and country-level variables to proxy for involvement in U.S. markets.² Further, they use S&P’s transparency and disclosure index which is based on a checklist of 98 disclosure items. They argue that higher scores represent more conformity with U.S. disclosure practices, and, using a sample of 794 firms from 24 countries, they find positive relations between most of their U.S. market measures and the S&P disclosure scores. Khanna et al. (2004) is important because it shows that the capital market is not the only market that may

¹ See Bushee (2004) for a discussion of the advantages and disadvantages of the different types of disclosure indexes.

² Khanna et al. (2004) use a U.S. listing variable and country-level variables related to U.S. equity investment and U.S. direct investment to measure involvement in U.S. capital markets, firm-level measures of U.S. exports, and U.S. operations, and a country-level measure of U.S. trade to proxy for U.S. product market interactions, and country-level measure of business travel to the United States to represent U.S. labor market involvement.

affect a multinational firm's disclosure policy. Instead, product market and labor market forces also can exert pressure on firms to increase disclosures even in the absence of capital market forces.

Together, these studies suggest that interactions by foreign firms with capital, product, and labor markets in the United States matter. Our intention is to take a broader perspective—we examine the effects of interactions with markets around the world. We argue that firms may disclose more as globalization increases because more exposure to the capital, product, or labor markets increases the demand for better disclosure.³ However, we also argue that this effect will be most pronounced for firms based in weak legal environments since these firms face weak demand for good disclosure at home and because their disclosures are likely to be viewed as less credible. Thus, we examine whether there is an interaction between globalization and the legal environment that affects disclosure.

3. Hypotheses

3.1. *Globalization and voluntary disclosure (H1)*

We draw on several streams of literature to explain why expansion into foreign markets can increase the demand for more disclosure. Though these studies focus on capital market forces, similar to Khanna et al. (2004), we see these arguments extending to the product and labor markets as well.

Prior literature on the home bias suggests that investors overweight (underweight) their portfolios with firms based in their home (foreign) countries. Merton's (1987) analysis suggests that information costs can create indirect barriers that lead investors to hold stocks they are familiar with, and prior research suggests that the home bias can arise from insufficient or inadequate information about the firm (e.g., Kang & Stulz, 1997; Ahearne, Grier, & Warnock, 2004; Bradshaw et al., 2004; Chan et al., 2005). This suggests that expansion into new markets creates information issues.

Further, there is evidence that suggests that investors and analysts have difficulty in interpreting or understanding information about multinational firms. Duru and Reeb (2002) find that analysts' forecast accuracy for U.S. firms is negatively related to their globalization, and they interpret this as evidence that the forecasting task is more complex when foreign operations are more extensive. Thomas (1999) and Callen et al. (2005) find that U.S. investors place less value on foreign earnings relative to domestic earnings. These authors suggest that their results might be due to poor disclosures.

Analytical research (e.g., Grossman & Hart, 1980; Milgrom, 1981; Verrecchia, 1983) suggests that firms have incentives to improve the information set available to investors because this can reduce information asymmetry, and can increase liquidity and lower the cost of capital. At a practical level, McKinsey & Co. (2002) reports that 70% of global investors rate accounting disclosures as being important when evaluating foreign investments. Also,

³ Globalization could also affect disclosure through firm complexity. That is, global firms may disclose more because they have more complex operations or financing arrangements that require greater disclosure. We design our tests to minimize this complexity effect. Specifically, rather than examine disclosures that are specifically related to international activity (e.g., geographic segment disclosures), we use a measure of overall disclosure

empirical evidence suggests that better financial reporting and disclosure can help in an international context. For example, Ashbaugh and Pincus (2001) find that analysts' forecast accuracy is higher after firms adopt IAS, and Hope (2003a) finds that analysts' forecast accuracy improves when firm-level disclosure increases. Leuz and Verrecchia (2000) find that German firms switching to U.S. GAAP reporting have lower information asymmetry than firms that continue to report under German GAAP, which is a lower disclosure-reporting regime.

The preceding arguments are largely couched in terms of capital markets, but the main issue – information asymmetry – also applies to users in the product and labor markets, and as Khanna et al. (2004) suggest, interactions with foreign product and labor markets can also create a demand for information and better disclosure from multinational firms. For example, they argue that customers require financial information to evaluate a foreign firm's long-term viability, and suppliers use financial statements in evaluating a foreign firm's creditworthiness. Likewise, employees and prospective employees can use financial disclosures in assessing employment opportunities with a foreign firm. These arguments are supported by Bowen, DuCharme, and Shores (1995) who argue that implicit contracts can affect a firm's accounting choices. These implicit contracts are relational contracts that depend on the firm's reputation. Given the unfamiliarity of firms when they enter foreign product or capital markets, multinational firms have incentives to provide additional information in order to establish and maintain a reputation. This can reduce costs associated with these relational contracts in the long-run.

Gray et al., (1995) and Cahan, Rahman, and Perera (2005) provide evidence that voluntary disclosure increases with globalization, but neither of those studies control for legal environments. Thus, we examine the following hypothesis:

H1. Controlling for legal environment, the level of voluntary disclosure for a firm is positively associated with its level of globalization.⁴

3.2. *Globalization, legal environment, and voluntary disclosure (H2)*

Prior research provides ample evidence that country-level legal and judicial institutions affect voluntary disclosures and other accounting properties (e.g., Ball et al., 2000; Jaggi & Low, 2000; Hope, 2003a,b; Leuz et al., 2003; Bushman et al., 2004). This literature builds on La Porta, Lopez-de Silanes, Shleifer and Vishny (1997) and La Porta, Lopez-de Silanes, Shleifer and Vishny (1998) who find that common-law countries have stronger investor rights.⁵ However, a shortcoming of the prior cross-country research is that it largely ignores the role of globalization. These studies implicitly assume that accounting outputs are

⁴ While H1 predicts that multinational firms would have incentive to voluntarily disclose more information, we recognize that firms may have proprietary reasons for not disclosing information (e.g., Dye, 1986). Ultimately, whether voluntary disclosure is increasing in globalization is an empirical question.

⁵ Based on this body of literature, our maintained assumption is that the legal environment matters in the context of disclosure and reporting decisions. Hence, we do not develop a separate hypothesis for the effect of legal environments on voluntary disclosure. However, since we want to examine the interaction between globalization and the legal environment, we include a legal environment variable in our regression models to capture its main effects. The full model is described in Section 4.4.

affected only by the legal environment in a firm's home country. One exception is Khanna et al. (2004), but their results are specific to U.S. markets and they do not consider the more complex issue of how incentives arising from foreign market involvement and the legal environment interact. The main contribution of our study is that we examine whether the interaction between globalization and the legal environment affects voluntary disclosures.

We contend that the impact of globalization on voluntary disclosures will be more pronounced in weak legal environments than in strong legal environments for two reasons. First, prior research establishes that accounting quality is generally lower when legal and judicial institutions are weak. For example, Jaggi and Low (2000) and Hope (2003b) provide evidence that disclosure levels are lower in civil-law countries. Thus, globalization can increase the benefits of disclosure for firms from weaker legal environments by exposing them to new markets where disclosure is more highly valued. Second, in weak legal regimes, investors and other market participants are likely to have less trust because they believe their rights will not be protected. For example, Durnev and Kim (2005) argue that a lack of trust among investors can lead to a higher cost of capital for firms in weak legal environments. Thus, in weak legal environments, firms with external financing have incentives to provide more extensive accounting disclosures in order to build trust and enhance their reputation. Similarly, implicit contracts depend on reputation so firms in weak legal environments also have incentives to improve their accounting disclosures to gain the trust of product and labor market participants such as customers, suppliers, and employees. This will increase the value of the firm's implicit contracts, leading to a higher firm value.

While Durnev and Kim (2005) suggest an interaction between globalization and legal environments, they do not test for it. We contribute to the literature by examining whether the interaction between globalization and legal environment affects voluntary disclosures. Formally, we hypothesize:

H2. The effect of globalization on voluntary disclosure is greater for firms based in countries with weak legal environments than for firms based in countries with strong legal environments.

4. Research design

4.1. *Voluntary disclosures*

We use a self-constructed measure of voluntary disclosures based on Francis et al. (2008). This is in contrast to other recent cross-country studies that use externally developed measures of total disclosures, e.g., Hope (2003b) who uses CIFAR ratings and Khanna et al. (2004) who use S&P's transparency and disclosure scores. Though externally developed indexes have the advantage of being objective and comprehensive, they also have disadvantages (e.g., Bushee, 2004; Francis et al., 2008). For example, these indexes capture total disclosures that include both mandatory and voluntary disclosures. Further, externally developed indexes offer lower construct validity since they were not created with a specific research question in mind, and they can restrict the researcher to nonrepresentative samples that may be motivated by commercial interests of the organization that prepared the index. Bushee (2004) argues that using a self-constructed index and hand-collected data is

likely to yield bigger payoffs for future researchers who want to examine disclosures internationally. In our case, using a self-constructed index allows us to isolate voluntary disclosures and more closely examine firm-level reporting incentives for a relatively large and diverse sample of international firms.

Francis et al. (2008) develop a voluntary disclosure index for U.S. firms in a study examining the effect of voluntary disclosure on the cost of capital. While they base their index on Botosan (1997), they note that their index differs in two important ways. First, they only consider “disclosure categories and elements which are clearly voluntary in nature” (Francis et al., 2008, 12), and second, they expand Botosan’s index to include non-GAAP measures of financial performance (e.g., free cash flow, residual income). Francis et al. (2008) rate their sample firms based on 25 items divided into four categories, i.e., historical results, other financial measures, non-financial measures, and projected information, and examine whether the disclosure scores are related to the firm’s cost of capital. However, they find that their results are driven by disclosure scores in two of these categories—other financial measures and non-financial measures. As a result, we use these two categories to measure voluntary disclosures.

We recognize that Francis et al. (2008) developed their index for U.S. firms. We use their index for a sample of non-U.S. firms because our goal is to identify a set of disclosures that is voluntary in all countries and that has economic significance. Since the United States is generally seen as having the most rigorous reporting and disclosure standards in the world (e.g., Reese & Weisbach, 2002), items that are disclosed voluntarily in the United States are very likely to be voluntary in other countries as well.⁶ Further, Francis et al. (2008) show that the items they disclose affect the firm’s cost of capital. This indicates that the items they include in their index have economic significance; in other words, these disclosures are not trivial.

We score the 2003 annual reports for our sample firms using an 11-item index that includes three other financial measures and eight non-financial measures. Table 1 lists these items.⁷ We expect that the three financial measures—free cash flows, economic profit, and cost of capital—will be important in the context of global firms because of the huge start-up

⁶ Nonetheless, similar to Francis et al. (2008), we still conduct exhaustive checks to ensure that each disclosure item is actually voluntary in every country in our sample using the following procedure. For every country and for every disclosure item, we conducted three Google searches using the following key words: (1) “accounting standards [country name] [disclosure item]”, (2) “company disclosure requirements [country name] [disclosure item]”, and (3) “stock exchange listing requirements disclosure [country name] [disclosure item]”. We also conducted two sets of further searches—one for international accounting standards (i.e. “international accounting standards [disclosure item]”) and one for European Union reporting requirements (i.e., “European Union company reporting requirements [disclosure item]”). We did not identify any instances where one of our disclosure items was required. Additionally, for a selected sample of English speaking countries (i.e., Australia, New Zealand, and Canada), we examined the local accounting pronouncements to see if any of the 11 items were required. However, because of language barriers and resource constraints, we were not able to do this for all countries. To the extent that our Google searches are not adequate, this is a limitation of the study.

⁷ Our 11-item index is similar in terms of number of items to other international studies that use self-constructed indexes. For example, Hung (2001) uses an 11-item index related to the use of accrual accounting, Ashbaugh and Pincus (2001) use a 12-item index related to differences from IAS, and Bradshaw et al. (2004) use a 13-item index related to U.S. GAAP conformity. The first two are country-level indexes while Bradshaw et al. (2004) is a firm-level index.

Table 1

Coding scheme used to compute VDISC

-
1. Other financial measures
 - a. Free cash flow (or cash flow other than that reported in the Statement of Cash Flows)
 - b. Economic profit, residual income type measure
 - c. Cost of capital (WACC, hurdle rate, EVA target rate)
 2. Non-financial measures
 - a. Number of employees
 - b. Average compensation per employee
 - c. Percentage of sales or services designed or introduced in past 3–5 years
 - d. Market share
 - e. Units sold (or other output measure, e.g., production, customers serviced)
 - f. Unit selling price (or other price measure, e.g., hourly rate)
 - g. Growth in units sold (or growth in other output measure)
 - h. Growth in investment (expansion plans, number of outlets, etc.)
-

Based on Francis et al. (2008).

costs and ongoing investments that global firms face in entering and operating in multiple geographic markets. We expect that the eight non-financial measures are useful for global firms because they remove the currency (i.e., translation) effects and they focus on measures of real activity which are not as easy to distort. Following Francis et al. (2008), we rate each item on a binary scale. If a firm discloses an item, we give it a score of one for that item. We refer to these scores as item scores. Thus, a firm's voluntary disclosure score, *VDisc*, is the sum of the 11 item scores.

Additionally, we employ a modified version of Francis et al. (2008) rating system. For each of the 11 items, we also give every firm a quality score based on the extent and richness of their disclosures. We rate the quality of the disclosure for each item as low, medium, or high.⁸ If the disclosure is rated as "low," it is given an item score of one; if it is rated "medium," it is given an item score of two; and if it is rated "high," it is given an item score of 3 (as before, a zero score is given for nondisclosure). We define *VDiscQ* as the sum of the quality scores for each of the 11 disclosure items. Since scoring *VDiscQ* require some subjectivity, we believe the results for *VDiscQ* should be interpreted in conjunction with *VDisc*.

As pointed out before, our intention is to measure voluntary disclosures at a broad level. Thus, we are not specifically interested in disclosures about the firm's international activities (e.g., geographic segment information). There are two reasons for this. First, our

⁸ To expand on our quality categories, low quality (i.e., a score of one) indicates that the firm disclosed the item but did not provide any additional discussion, medium quality (i.e., a score of two) indicates that the firm disclosed the item and provided some additional discussion but did not compare their own results to an industrial average or to the results of competitive firms, and high quality (i.e., a score of three) indicates that the firm disclosed the item, provided some additional discussion, and compared their own results to an industrial average or to the results of competitive firms. To reduce subjectivity, we use the following procedures: 1) For each disclosure item, a predefined list of key words is used to search in annual reports. 2) If a disclosure item is found, the evaluator would read a few neighboring paragraphs containing the key words to determine whether zero, one, two, or three should be given. 3) In assigning a score, we define "discussion" to mean that the annual report listed a breakdown of the required disclosure item, or listed or commented on the firm's previous years' figures or changes of the disclosed item.

hypotheses are not about a particular type of disclosure; we predict a firm's overall disclosures will be affected by globalization and the legal environment. Second, we want to minimize any supply-side effects. Global firms may disclose more since they have more complex operations or financing arrangements that require greater disclosure. Since our focus is on a market-based explanation, we specifically exclude disclosures related to international activity in order to minimize any complexity effect.

4.2. Test variables

We measure globalization as a single concept which is consistent with the literature on multinationals (e.g., Duru and Reeb, 2002). While our measure reflects interactions with foreign capital, product, and labor markets, we do not try to measure the effects of each of these markets separately. Instead, we take the view that globalization can involve a variety of interrelated activities (e.g., a firm that operates in Australia may hire locals, have interactions with Australian customers, and raise funds from Australian creditors). Thus, measures of globalization will be highly correlated.

We use a composite measure of globalization that is based on three measures. Based on Duru and Reeb (2002), we use the foreign sales ratio (*FSales*) and the number of foreign subsidiaries (*FSubs*).⁹ Similar to Hope (2003a), we use the number of foreign exchanges that a firm is listed on (*FList*). We factor analyze the three variables and use the factor scores from the first factor to measure globalization (*Global*).

We use hand-collected foreign activity data to augment data from Compustat because foreign activity data are available for only a limited number of non-U.S. firms on Compustat and other widely used databases.¹⁰ Specifically, we hand-collect data on foreign sales and foreign subsidiaries from the annual report, and we identify foreign listings by reviewing members of stock exchanges in each of our 30 countries using information from Datastream. As a result, we are able to examine the effects of globalization for a larger and more diverse sample of non-U.S. firms than prior studies have used.

Lang et al. (2003) point out that there is no single, universally accepted measure of legal environment. For our main tests, we use the most basic measure of legal environment, i.e., legal origin. As La Porta et al. (1997, 1998) and subsequent research have shown, legal origin is powerful enough to explain differences in country-level characteristics such as investor protection, financial development, and ownership patterns. We use a binary variable, *Legal*, that is coded one for common-law countries and zero for civil-law countries to measure legal origin. In additional tests, we use two alternative measures of legal environment. First, we use a measure of investor protection from Leuz et al. (2003). They identify three levels of investor protection from a cluster analysis based on nine

⁹ Duru and Reeb (2002) use the number of geographic segments rather than number of foreign subsidiaries. We use foreign subsidiaries because this reflects not only the extent of foreign operations but how they are organized. Duru and Reeb (2002) also use the foreign-asset ratio, but we exclude this since it would have significantly reduced our sample size. Only 72% of firms in our sample report foreign assets.

¹⁰ We are able to obtain some foreign-activity data using the geographic-segment data provided on the Compustat North America database. This is potentially available only for firms that are cross-listed in the United States.

institutional variables from La Porta et al. (1997, 1998).¹¹ Second, we use a measure of securities law from Bushman and Piotroski (2006) that is based on measures of private and public enforcement of securities law from La Porta, Lopez-de-Silanes, and Shleifer (2006).¹² Bushman and Piotroski (2006) use the arithmetic sum of the two indexes and classify countries as having either high or low enforcement.

4.3. Control variables

To control for other factors that might affect the level or quality of voluntary disclosures, we include controls for firm size, firm growth, financing needs, firm profitability, analyst following, and innate accrual quality. We include firm size to control for disclosure costs, incentives for private information acquisition, and legal costs (e.g., Lang & Lundholm, 1993) where firm size is measured using the log of the market value of equity ($\ln MVE$) (market value, MVE , is adjusted share price times adjusted shares outstanding from Compustat Global Issue). We control for firm growth using the log of the book to market ratio ($\ln BM$) (BM is Compustat Global Industrial Commercial #146/MVE) (e.g., Bamber & Cheon, 1998). Capital intensity ($CapInt$) (#76/#89) and the leverage (Lev) (#106/#89) are included to control for financing needs, and we control for firm performance using the return on assets (ROA) (#32/#89) (e.g., Bushee & Leuz, 2005). Further, following Hope (2003a) and others, we control for analyst following ($Analysis$) calculated from IBES. Based on prior literature, we expect a positive coefficient for each of these control variables.

In addition, Francis et al. (2008) find a complementary relation between innate information quality and voluntary disclosures using U.S. data. That is, as the fundamental quality of the information improves, managers provide more voluntary disclosure. They suggest that since innate accrual quality is a primitive construct of voluntary disclosure, tests that ignore innate accrual quality are likely to be confounded. Further controlling for earnings quality in an international context can be important because prior studies such as Hung (2001) find that accounting quality can differ between countries. Consequently, we also control for innate accrual quality.

We adopt an approach developed by Dechow and Dichev (2002) and McNichols (2002) and estimate the following regression:

$$CurAcc_{i,t}/A_t = \alpha + \beta_1 CFO_{t-1}/A_t + \beta_2 CFO_t/A_t + \beta_3 CFO_{t+1}/A_t + \beta_4 \Delta REV_{i,t}/A_t + \beta_5 PPE_{i,t}/A_t + \varepsilon \quad (1)$$

where $CurAcc$ is total current accruals in year t (change in current assets [Compustat Global Industrial Commercial #75] – change in current liabilities [#104] – change in cash

¹¹ The nine variables are related to stock market capitalization, number of listed domestic firms relative to the population, number of IPOs relative to the population, ownership concentration, antidirector rights, disclosure, efficiency of judicial system, rule of law, and corruption.

¹² La Porta et al. (2006) measure of public enforcement is based on four indexes related to supervisor attributes, enforcement powers, stop and do orders, and criminal sanctions. Their measure of private enforcement is based on three indexes related to disclosure and burden of proof (the disclosure index used by La Porta, Lopez-de-Silanes, and Shleifer, 2006) is based on disclosure requirements related to issuing securities and is not a measure of accounting disclosures.

[#60] + change in short-term debt [#94]); A is average total assets in year t and $t - 1$ (#89); CFO is cash flow from operations in year t , which is net income (#32) less total accruals (TAC) (change in current assets [#75] – change in current liabilities [#104] – change in cash [#60] + change in short-term debt [#94] – depreciation [#11]). ΔRET is change in revenues (#1) in year $t - 1$ to year t . PPE is gross value of property, plant, and equipment (#77) in year t .¹³

We estimate Eq. (1) on a time-series basis for each firm based on data for the period 1993–2004, the maximum number of years available on the Compustat Global database. Because computation of the lagged CFO requires two lag years and because computation of the year-ahead CFO requires one lead year, we use 9 years (1995–2003) to estimate Eq. (1). We take the standard deviation of the residuals for firm i over the 9 years as an estimate of total accrual quality (TAQ).

Following Dechow and Dichev (2002) and Francis et al. (2008), we regress TAQ on a series of innate factors, i.e.:

$$TAQ = \alpha + \beta_1 Size + \beta_2 \sigma CFO + \beta_3 \sigma Sales + \beta_4 OpCyc + \beta_5 NegEarn + \varepsilon \quad (2)$$

where $Size$ is the log of average total assets (89); σCFO is the standard deviation of CFO , scaled by total assets; $\sigma Sales$ is the standard deviation of sales revenue (#1), scaled by total assets; $OpCyc$ is the average of the sum of accounts receivable days and inventory days (based on #1, #4, #63, #66); and $NegEarn$ is the number of years of negative earnings (#32). We then use the predicted values from Eq. (2) as estimates of innate accrual quality (IAQ).¹⁴ Since large values of IAQ indicate poorer innate accrual quality, we expect a negative relation between IAQ and $VDisc$ ($VDiscQ$).

4.4. Model

We estimate the following regression model to test H1 and H2:

$$\begin{aligned} VDisc(VDiscQ) = & \alpha + \beta_1 Global + \beta_2 Legal + \beta_3 Global * Legal + \beta_4 IAQ \\ & + \beta_5 \ln MVE + \beta_6 \ln BM + \beta_7 CapInt + \beta_8 Lev + \beta_9 ROA \\ & + \beta_{10} Analysts + \varepsilon \end{aligned} \quad (3)$$

where β_1 and β_3 test H1 and H2 respectively. We expect a positive coefficient for β_1 and a negative coefficient for β_3 .

4.5. Sample

We select our sample in a two-step process. As a first step, we identify all firms on the Compustat Global database that have data for all the variables in our tests except for data on

¹³ Consistent with prior research (e.g., Francis et al., 2005; Kothari, Leone, and Wasley, 2005), throughout our analyses, we winsorize all distributions to the 1 and 99 percentiles.

¹⁴ Francis et al. (2008) find that the significance of most of their traditional control variables (e.g., firm size, log of the book-to-market ratio) decreases when innate accrual quality is included in a regression model explaining voluntary disclosure. They argue that innate accrual quality subsumes the explanatory power since innate accrual quality is based on similar characteristics. Since not much is known about innate accrual quality in an international context, we include both innate accrual quality and the traditional control variables in our models.

foreign sales, foreign subsidiaries, and foreign listings (we collect the bulk of our foreign activity data from other sources, primarily annual reports). We find that 854 firms from 49 countries satisfy this criterion. The data requirement for IAQ is by far the most limiting since it requires 11 years of data. Thus, our sample consists of long-lived, surviving firms. While we acknowledge that this introduces a bias that can reduce the generalizability of our results, it also helps us in two ways: (1) It increases homogeneity in our sample which reduces the possibility of omitted variables (e.g., start-up firms or younger firms may be fundamentally different from our firms), and (2) it increases the likelihood that at least some of our firms will be highly globalized since establishing an international presence takes time.

As a second step, we search the Internet for usable annual reports for the 854 firms. We use the 2003 annual report, but in 39 cases the 2003 report was not available so we use the 2002 (20 firms) or 2004 (19 firms) report instead. Thus, we are able to obtain annual reports for 750 of the initial 854 companies. Of these, 49 were not in English, and these were deleted.¹⁵ Clearly, this also affects the generalizability of our results. At best, our results can only be extended to companies that report in English. Further, we delete another 58 firms that did not have data on foreign sales available through Compustat Global or through their annual reports.¹⁶ After deleting the non-English reports and firms without foreign sales data, we have a final sample of 643 firms from 30 countries.

One consideration with hand-collected disclosure data is that because the process is time intensive, sample sizes are often small. For example, Botosan (1997) uses hand-collected data for a sample of 122 manufacturing firms, and Guo, Lev, and Zhou (2004) use hand-collected data for a sample of 49 biotech firms.¹⁷ Our sample size compares favorably with Francis et al. (2008) who with 681 firms have one of the largest samples with hand-collected disclosure data.

Further, our sample also compares favorably with recent cross-country studies that use externally developed indexes. For example, Khanna et al. (2004) use a sample of 794 firms from 24 countries, Francis et al. (2005) use 672 firms from 34 countries, and Durnev and Kim (2005) use two samples—one of 494 firms from 24 countries that are included in the Credit Lyonnais Securities Asia governance ratings and another of 573 companies from 16 countries that have S&P's transparency and disclosure scores. Thus, even though we use hand-collected data, we do not have to compromise on sample size.

5. Results

5.1. Descriptive statistics and preliminary analyses

Table 2 provides a breakdown of the sample by country. Our sample includes firms from 30 countries, 11 common-law countries and 19 civil-law countries. While the number of

¹⁵ Of the 49 non-English reports, 38 were in Japanese, five in Portuguese, five in Spanish, and one in French.

¹⁶ In the final sample, we have 565 firms with foreign activity data from the annual report and 78 firms with foreign activity data from the Compustat North America database (as pointed out in footnote 12, the Compustat data are potentially available only for firms cross-listed in the United States). When we have both annual report and Compustat data, we use the annual report amounts to verify the Compustat amounts. In a few cases where amounts were not the same, we use the annual report amounts in our tests.

¹⁷ We recognize that both Botosan (1997) and Guo et al. (2004) collect more extensive data for each firm than we do.

Table 2
Sample firms by country

Country	Frequency	%
Argentina	3	0.47
Australia ^a	47	7.31
Austria	1	0.16
Belgium	2	0.31
Brazil	14	2.18
Canada ^a	97	15.09
Chile	3	0.47
Denmark	3	0.47
Finland	7	1.09
France	19	2.95
Germany	18	2.79
Hong Kong ^a	43	6.69
India	6	0.93
Ireland ^a	6	0.93
Israel ^a	4	0.62
Japan	37	5.75
Korea	4	0.62
Malaysia ^a	56	8.71
Mexico	1	0.16
Netherlands	5	0.78
New Zealand ^a	7	1.09
Philippines	4	0.62
Singapore ^a	28	4.35
Sweden	4	0.62
Thailand ^a	40	6.22
Taiwan	1	0.16
South Africa ^a	5	0.78
Spain	1	0.16
Switzerland	16	2.49
United Kingdom ^a	161	25.04
Total	643	100.00

^a Denotes common-law country. Country classifications are based on La Porta et al. (1998).

common-law countries is less, common-law countries are represented by more firms in our sample than civil-law countries. Overall, we have 494 firms from common-law countries (76.8% of the sample) and 149 firms from civil-law countries (23.2%). Also, 40.1% of the sample comes from just two common-law countries, i.e., the United Kingdom (25%) and Canada (15.1%). To address concerns that these countries might be driving our results, we report sensitivity tests with the U.K. and Canadian firms omitted.

Table 3, panel A provides descriptive statistics for VDisc and VDiscQ. VDisc has a mean of 3.484 and a median of three. The minimum is zero which indicates that none of the 11 disclosure items were disclosed. The maximum is nine which indicates that nine of the 11 items were provided. Thus, based on our index, generally the level of voluntary disclosure is modest, but some firms disclose at high levels. Further, the mean (median) for our voluntary disclosure quality index, VDiscQ, is 5.961 (5.000). The maximum for VDiscQ is 17 from a theoretical maximum of 33 (i.e., 11 items times a maximum of three

Table 3

Descriptive statistics

Panel A. Descriptive statistics for dependent variables

	Mean	Standard deviation	Minimum	Median	Maximum
VDisc	3.484	1.867	0.000	3.000	9.000
VDiscQ	5.961	3.690	0.000	5.000	17.000

Panel B. Frequencies by item for VDisc and VDiscQ

Item	VDisc		VDiscQ		
	=0	=1	=1	=2	=3
Free cash flows	540	103	33	70	0
Residual income	614	29	6	23	0
Cost of capital	606	37	15	22	0
Number of employees	80	563	184	379	0
Avg. compensation	230	413	244	169	0
Percentage in last 3–5 years	620	23	13	9	1
Market share	476	167	60	79	28
Units sold	339	304	66	226	12
Unit price	513	130	24	98	8
Sales growth	413	230	34	190	6
Investment growth	402	241	16	225	0

Panel C. Distribution of firms by VDisc score

Item	N	%
0	27	4.2%
1	40	6.2%
2	166	25.8%
3	121	18.8%
4	96	14.9%
5	97	15.1%
6	56	8.7%
7	26	4.0%
8	8	1.2%
9	6	0.9%
10	0	0.0%
11	0	0.0%
Total	643	

Part D. Descriptive statistics for other variables

	Mean	Standard deviation	Minimum	Median	Maximum
Legal	0.770	0.421			
<i>Globalization variables</i>					
FSale	0.398	0.378	0.000	0.302	1.000
FSub	17.456	34.040	0.000	5.000	218.000
FList	1.409	1.672	0.000	1.000	7.000
<i>Control variables</i>					
IAQ	0.019	0.011	0.002	0.016	0.054

Table 3 (continued)

Part D. Descriptive statistics for other variables

	Mean	Standard deviation	Minimum	Median	Maximum
<i>Control Variables</i>					
lnMVE	6.415	2.162	1.571	6.381	13.292
lnBM	−0.515	1.050	−6.261	−0.422	1.373
CapInt	0.355	0.226	0.007	0.332	0.867
Lev	0.149	0.129	0.000	0.135	0.500
ROA	0.037	0.082	−0.383	0.040	0.259
Analysts	8.238	9.813	0.000	5.000	45.000

Panel A provides descriptive statistics for the two alternative dependent variables which are defined as follows: VDisC = sum of item scores for 11 voluntary disclosure items shown in Table 1 where an item score is zero for nondisclosure, one for disclosure;

VDisQ = sum of item quality scores for 11 voluntary disclosure items shown in Table 1 where an item quality score is 0 for nondisclosure, one for disclosure of low quality, two for disclosure of medium quality, and three for disclosure of high quality.

VDisC and VDisQ are based on the 2003 annual report except in 39 cases where the 2003 report was not available. In these cases, the 2002 (20 firms) or 2004 (19 firms) report is used instead.

Panel B provides frequencies for the disclosure items on an item by item basis. The “0” column represents the number of firms (out of 643) that did not disclose that item. The “1” column represents the number of firms (out of 643) that did disclose that item.

Panel C provides a breakdown of sample firms by VDisC score (defined as above). The maximum score for VDisC is nine out of a theoretical maximum of 11. No firms in the sample have a score of 10 or 11.

Panel D provides descriptive statistics for the other individual variables used in the study. The variables are defined as follows:

Legal = one, if firm is based in common-law country, zero, if based in civil-law country where country classifications are based on La Porta et al. 1998);

FSale = foreign sales/total sales (hand-collected from annual report or Compustat Global Issue);

FSubs = number of foreign subsidiaries (hand-collected from annual report);

FList = number of foreign stock exchanges that a firm is listed on (from Datastream);

IAQ = innate accrual quality which is estimated as described below;

lnMVE = log of market value of equity (adjusted share price × adjusted shares outstanding, from Compustat Global Issue) at the end of 2003 in U.S. dollars;

lnBM = ratio of log of the book value of equity (Compustat Global Industrial Commercial #146) to market value of equity at the end of 2003;

CapInt = net plant, property, and equipment (#76)/total assets (#89) at the end of 2003;

Lev = total debt (#106)/total assets (#89) at the end of 2003;

ROA = net income (#32)/total assets (#89) at the end of 2003;

Analysts = number of analysts following the firm (from IBES) at the end of 2003.

We compute IAQ as follows. We first estimate the regression:

$$\text{CurAcc}_t = \alpha + \beta_1 \text{CFO}_t + \beta_2 \text{CFO}_{t-1} + \beta_3 \text{CFO}_{t-2} + \beta_4 \text{IREV}_t + \beta_5 \text{PPE}_t + \epsilon_t$$

where CurAcc is total current accruals in year t (change in current assets [Compustat Global Industrial Commercial #75] – change in current liabilities [#104] – change in cash [#60] – change in short-term debt [#94]), t is average total assets in years t and $t-1$ (#89), and CFO is cash flow from operations in year t is net income (#32) less total accruals (TAC) (change in current assets [#75] – change in current liabilities [#104] – change in cash [#60] – change in short-term debt [#94] – depreciation [#11]). ΔREV is change in revenues (#1) in year $t-1$ to year t . PPE is gross value of property, plant, and equipment (#77) in year t . Using data for the period 1995–2003, we estimate the above equation on a time-series basis for each firm. The standard deviation of the residuals for firm i is used as an estimate of total accrual quality (TAQ). We then regress TAQ on firm size (#89), CFO scaled by total assets (#89), standard deviation of sales revenue (#1), operating cycle (i.e., the sum of accounts receivable days and inventory days [based on #1, #4, #63, #66]), and the number of years with negative earnings (#32). We use the predicted values from the second regression as a measure of innate accrual quality (IAQ) where high values of IAQ indicate poor innate accrual quality.

per item) which suggests that none of the firms in our sample are achieving both a high quantity and high quality of voluntary disclosures.

Table 3, panels B and C provide more detail on the composition and distribution of VDisc. Panel B shows the frequency of disclosure by item. The most commonly disclosed items are number of employees (disclosed by 87.6% of firms), average compensation (64.2%), and units sold (47.2%). The least common are the percentage of items sold that were designed or introduced in the last 3–5 years (3.6%), residual income (4.5%), and the cost of capital (5.8%). Table 3, panel C contains a breakdown of the sample by VDisc. The largest percentage of firms have disclosure scores of two (25.8%), followed by 18.8% with a score of three.

Table 3, panel D presents descriptives for the remaining variables. Of particular interest are the globalization variables. The mean (median) for *FSale* is 0.398 (0.302) which indicates that, on average, almost 40% of sales for our sample are foreign sourced. The mean for *FSub* is 17.456 foreign subsidiaries, but this is influenced by outliers as the median for *FSub* is five. Also, the mean (median) for *FList* is 1.409 (1). While most firms have at least one foreign listing, *FList* varies from zero–seven so some firms have numerous foreign listings.

Table 4 contains results of the factor analysis of the three global variables. Table 4, panel A shows that the three globalization variables are positively correlated with *r*s ranging from 0.350 to 0.397. Table 4, panel B indicates that there is one common component with significant explanatory power (i.e., an eigenvalue exceeding one), and we use the factor score

Table 4
Results of factor analysis of three global diversification variables

Panel A. Pearson correlation matrix			
	FSales	FSubs	FList
FSales	1.000		
FSubs	0.378	1.000	
FList	0.350	0.397	1.000
Panel B. Total variance explained			
Component	Eigenvalue	% of variance	Cumulative %
1	1.668	55.616	55.616
2	0.708	23.613	79.229
3	0.623	20.771	100.000
Panel C. Factor loadings for Global			
Variable	Loading		
FSales	0.723		
FSubs	0.739		
FList	0.775		

Panel A provides Pearson correlations for three measures of globalization, *FSales*, *FSubs*, and *FList* which are defined in Table 3.

Panel B provides results from a factor analysis of the three measures. Three components are extracted with only one component, here, with an eigenvalue in excess of 1. Factor scores for the first factor are used as a composite measure of globalization, and this variable is labelled Global.

Panel C provides the factor loadings for Global.

Table 5
Pairwise correlations among the independent variables

	Legal	Global	IAQ	lnBM	lnMVE	CapInt	Lev	ROA	Analysts
Legal									
Global	0.258***		0.259*	-0.003	0.354***	0.031	0.061	0.054	0.153***
IAQ	0.241***	0.265***	-0.280***	0.202***	0.499***	0.078**	0.207***	0.124***	0.316***
lnBM	0.119	-0.133***	-0.074*	0.151***	0.694***	0.164***	0.189***	-0.273***	-0.474***
lnMVE	-0.391***	0.505***	0.612***	0.538***	-0.476***	0.010	-0.040	0.410***	-0.390***
CapInt	0.052	0.118***	-0.164***	0.007	0.078*	0.083	0.278***	0.200***	0.662***
Lev	0.035	0.152***	0.144***	0.063	0.215***	0.239***	0.218***	0.001	0.059
ROA	-0.048	-0.060	-0.374***	0.229***	0.277***	0.041	0.152***	0.223***	0.224***
Analysts	0.156***	0.362***	0.361***	-0.210***	0.539***	0.035	0.140***	0.155***	0.153***

Pearson correlations are presented below the diagonal. Spearman correlations are presented above the diagonal. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively (two-tailed).

from this component to represent globalization, Global. Final loadings (Table 4, panel C) show that this factor loads most heavily on FI1st, but all loadings are similar and exceed 0.723.

Table 5 provides the pairwise correlations for the independent variables. Based on the Pearson correlations (the Spearman correlations are similar), Legal is negatively and significantly related to Global, lnMVE, and Analysts. This indicates that civil-law firms in the sample are more internationally diversified, are larger, and have a larger analyst following than common-law firms in the sample. To an extent, this is because the civil-law sample contains fewer firms per country, which suggests that civil-law firms in the sample will be the bigger, more established ones in those countries. On the other hand, Global is positively and significantly correlated with lnMVE, Lev, Analysts, and is negatively and significantly correlated with lnBM and CapInt. Thus, firms with greater foreign involvement are larger and have more leverage, a larger analyst following, higher growth, and lower capital intensity than firms with less foreign involvement. Also, it is worth noting that firm size is significantly correlated with all of the other independent variables.

5.2. Regression results for H1 and H2

We use Eq. (3) to test the validity of the two hypotheses simultaneously. Table 6 presents the main results using two alternative dependent variables, VDisc and VDiscQ. Both models have reasonable explanatory power with R^2 's of 20.3% and 20.9%, respectively. Since the results for the two models are similar, we discuss them simultaneously. In both models, Global is positive and significant at least at the 0.05 level based on a one-tailed test. Consistent with H1, voluntary disclosure is increasing in globalization. This is consistent with the view that foreign involvement creates incentives for firms to improve their disclosures.

Consistent with H2, we find that the interaction between globalization and the legal environment, i.e., Global*Legal, is significant at the 0.01 level and negatively signed. This indicates that, for the same level of globalization, there is less (more) voluntary disclosure

Table 6
Regression results

Model VDisc VDiscQ $\alpha + \beta_1 \text{Global} + \beta_2 \text{Legal} + \beta_3 \text{Global*Legal} + \beta_4 \text{LAQ} + \beta_5 \text{lnMVE} + \beta_6 \text{lnBM} + \beta_7 \text{CapInt} + \beta_8 \text{Lev} + \beta_9 \text{ROA} + \beta_{10} \text{Analysts} + \epsilon$				
Variables	VDisc		VDiscQ	
Intercept	0.752	1.39	0.584	0.55
H1, Global (+)	0.307	2.33***	0.560	2.16**
Legal (+)	0.055	0.31	−0.277	−0.79
H2, Global*Legal (−)	−0.402	−2.53***	−1.073	−3.43***
LAQ (+)	0.199	0.02	5.873	0.33
lnBM (+)	0.193	2.27**	0.422	2.52***
lnMVE (+)	0.313	4.97***	0.605	4.89***
CapInt (+)	1.015	3.27***	2.521	4.12***
Lev (+)	1.364	2.47***	2.595	2.38***
ROA (+)	2.092	2.23**	4.238	2.29***
Analysts (+)	0.012	1.45*	0.032	1.98**
F	643		643	
Adjusted R^2	0.203		0.209	
F-statistic	17.33***		17.98***	

for firms based in common-law (civil-law) countries. This supports two nonmutually exclusive views: either globalization increases the benefits of disclosure for firms from weak legal-environment countries by exposing them to new markets where disclosure is more highly valued or that firms from weak legal environment countries need to disclose more to overcome concerns about the weak laws and institutions that they face at home.

Based on our coding, the coefficient for Global represents the incremental effect of globalization on voluntary disclosures for civil-law based firms. The combined coefficients for Global and Global * Legal represent the incremental effect of disclosure for common-law-based firms. When VDisc is the dependent variable, the combined coefficient (i.e., $0.307 + [-0.402] = -0.095$) is not significant ($t = -1.13$), which indicates that globalization has no effect on voluntary disclosure in common-law countries. This is consistent with the view that common-law firms already face pressure to disclose at a high level. When

Notes to Table 6

This table provides estimates from the regression of voluntary disclosure on globalization, legal environment, the interaction of globalization and legal environment, and control variables. The results in columns 2 and 3 are based on a model where VDisc is the dependent variable. The results in columns 3 and 4 are based on a model where VDiscQ is the dependent variable. Variables are defined as follows:

VDisc = sum of item scores for 11 voluntary disclosure items shown in Table 1 where an item score is zero for nondisclosure, one for disclosure;

VDiscQ = sum of item quality scores for 11 voluntary disclosure items shown in Table 1 where an item quality score is zero for nondisclosure, one for disclosure of low quality, two for disclosure of medium quality, and three for disclosure of high quality;

Legal = one, if firm is based in common-law country, zero, if based in civil-law country where country classifications are based on La Porta et al., 1998);

IAQ = innate accrual quality which is estimated as described below;

lnBM = ratio of log of the book value of equity (Compustat Global Industrial Commercial #146) to market value of equity at the end of 2003;

lnMVE = log of market value of equity (adjusted share price \times adjusted shares outstanding, from Compustat Global Issue) at the end of 2003 in U.S. dollars;

CapInt = net plant, property, and equipment (#76)/total assets (#89) at the end of 2003;

Lev = total debt (#106)/total assets (#89) at the end of 2003;

ROA = net income (#32)/total assets (#89) at the end of 2003;

Analysts = number of analysts following the firm (from IBES) at the end of 2003.

We compute IAQ as follows. We first estimate the regression:

$$\text{CurAcc}_t / A_t = \alpha + \beta_1 \text{CFO}_{t-1} / A_t + \beta_2 \text{CFO}_t / A_t + \beta_3 \text{CFO}_{t+1} / A_t + \beta_4 \Delta \text{REV}_t / A_t + \beta_5 \text{PPE}_t / A_t + \epsilon_t$$

where CurAcc is total current accruals in year t (change in current assets [Compustat Global Industrial Commercial #75] – change in current liabilities [#104] – change in cash [#60] + change in short term debt [#94]), A_t is average total assets in year t and $t - 1$ (#89), and CFO is cash flow from operations in year t is net income (#32) less total accruals (TAC) (change in current assets [#75] – change in current liabilities [#104] – change in cash [#60] + change in short-term debt [#94] – depreciation [#11]). ΔREV is change in revenues (#1) in year $t - 1$ to year t . PPE is gross value of property, plant and equipment (#77) in year t . Using data for the period 1995–2003, we estimate the above equation on a time-series basis for each firm. The standard deviation of the residuals for firm i is used as an estimate of total accrual quality (TAQ). We then regress TAQ on firm size (#89), CFO scaled by total assets (#89), standard deviation of sales revenue (#1), operating cycle (i.e., the sum of accounts receivable days and inventory days [based on #1, #4, #63, #66]), and the number of years with negative earnings (#32). We use the predicted values from the second regression as a measure of innate accrual quality (IAQ) where high values of IAQ indicate poor innate accrual quality.

*, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively (one-tailed).

VDisQ is the dependent variable, the combined coefficient for common-law firms is significant but negative (i.e., $0.560 + [-1.073] = -0.613$, $t = -2.50$). It is not clear to us why the quality of voluntary disclosures for common-law firms might decrease as globalization increases. We suggest this as an area for future research.

We also compute the F -statistic to test the joint explanatory power of Global and Global*Legal. The F -statistic is 3.468 for the VDisc model which is significant at the 5% level (two-tailed). The F -statistic is 5.983 for the VDisQ model which is significant at the 1% level (two-tailed). Together, this shows that Global and Global*Legal are not redundant

Table 7

Regression results using alternative measure for legal origin

Panel A. Investor protection

Model: $VDisc(VDisQ) = \alpha + \beta_1 Global + \beta_2 InvPro + \beta_3 Global * InvPro + \beta_4 IAQ + \beta_5 lnMVE + \beta_6 lnBM + \beta_7 CapInt + \beta_8 Lev + \beta_9 ROA + \beta_{10} Analysts + \varepsilon$				
Variables	VDisQ		VDisQ	
Intercept	1.424	2.61	2.510	2.34
H1 , Global (+)	0.415	1.92**	1.002	2.35***
InvPro (+)	-0.182	-1.65	-0.866	-3.98
H2 , Global*InvPro (-)	-0.211	1.63*	-0.660	-2.59***
IAQ (+)	-0.390	-0.04	2.793	0.15
lnBM (+)	0.216	2.17**	0.503	2.56***
lnMVE (+)	0.272	4.25***	0.511	4.05***
CapInt (+)	0.978	3.08***	2.503	4.00***
Lev (+)	1.088	1.92**	2.283	2.05**
ROA (+)	2.150	2.20**	4.002	2.07**
Analysts (+)	0.015	1.81**	0.042	2.52***
n	611		611	
Adjusted R^2	0.192		0.207	
F -statistic	15.53***		16.95***	

Panel B. Securities law

Model: $VDisc(VDisQ) = \alpha + \beta_1 Global + \beta_2 SecLaw + \beta_3 Global * SecLaw + \beta_4 IAQ + \beta_5 lnMVE + \beta_6 lnBM + \beta_7 CapInt + \beta_8 Lev + \beta_9 ROA + \beta_{10} Analysts + \varepsilon$				
Variables	VDisQ		VDisQ	
Intercept	0.870	1.65	0.695	0.67
H1 , Global (+)	0.309	2.19**	0.393	1.41*
SecLaw (+)	-0.050	-0.28	-0.367	-1.04
H2 , Global*SecLaw (-)	-0.372	-2.27**	0.727	-2.24**
IAQ (+)	0.644	0.07	6.823	0.38
lnBM (+)	0.202	2.39***	0.469	2.80***
lnMVE (+)	0.309	5.03***	0.616	5.07***
CapInt (+)	0.969	3.13***	2.340	3.83***
Lev (+)	1.335	2.41***	2.457	2.25**
ROA (+)	2.088	2.22**	4.259	2.29***
Analysts (+)	0.014	1.72**	0.038	2.33***
n	643		643	
Adjusted R^2	0.202		0.201	
F -statistic	17.24***		17.15***	

Notes to Table 7

Panel A provides estimates from the regression of voluntary disclosure on globalization, legal environment, the interaction of globalization and legal environment, and control variables. The results in columns 2 and 3 are based on a model where VDisc is the dependent variable. The results in columns 3 and 4 are based on a model where VDiscQ is the dependent variable. Panel B provides estimates from the regression of voluntary disclosure on legal environment and control variables. The results in columns 2 and 3 are based on a model where VDisc is the dependent variable. The results in columns 3 and 4 are based on a model where VDiscQ is the dependent variable. Variables are defined as follows:

VDisc = sum of item scores for 11 voluntary disclosure items shown in Table 1 where an item score is zero for nondisclosure, one for disclosure;

VDiscQ = sum of item quality scores for 11 voluntary disclosure items shown in Table 1 where an item quality score is zero for nondisclosure, one for disclosure of low quality, two for disclosure of medium quality, and three for disclosure of high quality;

InvPro = based on Leuz et al. (2003) who perform a cluster analysis on nine variables related to investor protection at the country-level. The nine variables are related to stock market capitalization, number of listed domestic firms relative to the population, number of IPOs relative to the population, ownership concentration, anti-director rights, disclosure, efficiency of judicial system, rule of law, and corruption. Leuz et al. (2003) identify three clusters of investor protection. We code InvPro equal to two for firms from countries in their high investor protection cluster, equal to one for firms from countries in their medium investor protection cluster, and equal to zero for firms in their low investor protection cluster;

SecLaw = based on Bushman and Piotroski (2006). Their measure is the arithmetic sum of two indexes of securities law enforcement developed by La Porta et al. (2006), one measuring public enforcement and the other measuring private enforcement. La Porta et al. (2006) measure of public enforcement is based on four indexes related to supervisor attributes, investigative powers, stop and do orders, and criminal sanctions. Their measure of private enforcement is based on two indexes related to disclosure, and burden of proof. SecLaw is a binary variable that is coded one for strong enforcement countries. Our values are from Bushman and Piotroski's (2006)

Appendix 2:

IAQ = innate accrual quality which is estimated as described below;

lnBM = ratio of log of the book value of equity (Compustat Global Industrial Commercial #146) to market value of equity at the end of 2003;

lnMVE = log of market value of equity (adjusted share price \times adjusted shares outstanding, from Compustat Global Issue) at the end of 2003 in U.S. dollars;

CapInt = net plant, property, and equipment (#76)/total assets (#89) at the end of 2003;

Lev = total debt (#106)/total assets (#89) at the end of 2003;

ROA = net income (#32)/total assets (#89) at the end of 2003;

Analysts = number of analysts following the firm (from IBES) at the end of 2003.

We compute IAQ as follows. We first estimate the regression:

$$\text{CurAcc}_{i,t} = \alpha + \beta_1 \text{CFO}_{i,t} + \beta_2 \text{CFO}_{i,t-1} + \beta_3 \text{CFO}_{i,t-2} + \beta_4 \Delta \text{REV}_{i,t-1} + \beta_5 \text{PPF}_{i,t-1} + \epsilon_{i,t}$$

where CurAcc is total current accruals in year t (change in current assets [Compustat Global Industrial Commercial #75] – change in current liabilities [#104] – change in cash [#60] + change in short-term debt [#94]), t is average total assets in years t and $t-1$ (#89), and CFO is cash flow from operations in year t is net income (#32) less total accruals (TAC) (change in current assets [#75] – change in current liabilities [#104] – change in cash [#60] + change in short-term debt [#94] – depreciation [#11]). ΔREV is change in revenues (#1) in year $t-1$ to year t . PPF is gross value of property, plant and equipment (#77) in year t . Using data for the period 1995–2003, we estimate the above equation on a time-series basis for each firm. The standard deviation of the residuals for firm i is used as an estimate of total accrual quality (TAQ). We then regress TAQ on firm size (#89), CFO scaled by total assets (#89), standard deviation of sales revenue (#1), operating cycle (i.e., the sum of accounts receivable days and inventory days [based on #1, #4, #63, #66]), and the number of years with negative earnings (#32). We use the predicted values from the second regression as a measure of innate accrual quality (IAQ) where high values of IAQ indicate poor innate accrual quality.

*, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively (one-tailed).

variables and that they provide explanatory power that is incremental to Legal and the other control variables.

For the control variables, all are significant and correctly signed except for Legal and IAQ. Thus, voluntary disclosure, whether measured based on quantity only (VDisC) or quantity and quality (VDisCQ), is positively related to growth, firm size, capital intensity, leverage, ROA, and analyst following. This is consistent with most of the prior research. On the other hand, Legal is not significant in either model. Thus, other things equal, voluntary disclosures do not differ between common-and civil-law-country firms. This is contrary to Jaggi and Low (2000) and Hope (2003b) who find that disclosures are higher in common-law countries. However, both of these studies use the CIFAR ratings which include mandatory and voluntary disclosures so their results may be capturing differences in mandatory disclosures across countries. Including mandatory disclosures in the index is inappropriate because mandatory disclosures and legal origin will be highly correlated since mandatory disclosures reflect accounting standards and common-law countries have more rigorous accounting standards. Also, our results are different from Francis et al. (2008) who find that IAQ is more highly related to their voluntary disclosure measure than their control variables which include firm size, growth, analyst following, and ROA.¹⁸

5.3. Additional analyses for legal environment

We consider whether our results are sensitive to the way we measure legal environment. As mentioned above, we use two alternative measures for legal environment, i.e., a measure of investor protection from Leuz et al. (2003) and a measure of securities law enforcement from Bushman and Piotroski (2006). Table 7 provides the results. For Table 7, panel A, we code investor protection (*InvPro*) equal to two if the firm's home country is in Leuz et al. (2003) high investor protection cluster, equal to one if the firm's home country is in their medium investor protection cluster, and equal to zero if the firm's home country is in their low investor protection cluster. The results are similar to our main results. Whether we use VDisC or VDisCQ, Global is positive and significant which supports H1, and Global**InvPro* is negative and significant which supports H2.¹⁹

For Table 7, panel B, we code securities law enforcement (*SecLaw*) equal to one if a firm's home country is listed as a high securities law-enforcement country using data provided in Bushman and Piotroski (2006, Appendix 2). Our results are again similar to the main results. Both H1 and H2 are supported. Combined, the results in Table 7 indicate that our results are robust to different definitions of legal environment.

We also consider the possibility that the legal environment in the firm's host country might matter since, in addition to the home country's legal environment, the legal

One reason for the difference is that accrual quality may not be a good measure of earnings quality (Wysocki, 2005). Wysocki (2005) argues that the Dechow and Dichev (2002) accrual quality measure, which is used by Francis et al. (2008) is dominated by a negative contemporaneous correlation between cash flows and accruals and that it randomly decomposes accruals. Alternatively, it is possible that the problems Wysocki (2005) identifies are intensified when using cross country data, making IAQ a much noisier measure when used in an international context (Francis et al. (2008) only examine U.S. firms).

We find the coefficient for *InvPro* has *t*-values that reach statistical significance based on two-tailed tests, but since they are incorrectly signed, they are not significant in our one-tailed tests.

Table 8
Regression results controlling for legal environment in primary host country

Variables	VDisc		VDiscQ	
Intercept	0.766	1.41	0.634	0.59
H1. Global (+)	0.287	2.13**	0.483	1.86**
Legal (+)	0.067	0.38	-0.231	-0.66
H2. Global* Legal (-)	0.408	-2.56***	-1.096	-3.50***
IAQ (-)	-0.313	0.03	3.999	0.23
lnBM (+)	0.190	2.23**	0.411	2.45***
lnMVE (+)	0.307	4.83***	0.583	4.67***
CapInt (+)	0.991	3.17***	2.432	3.96***
Lev (+)	1.333	2.40***	2.479	2.27***
ROA (+)	2.043	2.17**	4.059	2.19***
Analysts (+)	0.011	1.36*	0.029	1.82**
Host (+)	0.126	0.74	0.463	1.39*
n	643		643	
Adjusted R ²	0.202		0.210	
F-statistic	15.79***		16.55***	

This table provides estimates from the regression of voluntary disclosure on globalization, legal environment, the interaction of globalization and legal environment, and control variables. The results in columns 2 and 3 are based on a model where VDisc is the dependent variable. The results in columns 3 and 4 are based on a model where VDiscQ is the dependent variable. All variables, except Global and Host, are defined in Table 3. Global is defined in Table 4. Host is defined as:

Host = one, if firm is cross-listed in at least one common-law country; zero, otherwise

*, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively (one-tailed).

environment in the host country may have an impact on voluntary disclosures as well. To examine this, we include an additional control variable, *Host*, which captures the legal environment in the firm's host country (or countries). Host is equal to one if a firm is cross-listed in at least one common-law country and zero otherwise. Thus, this variable controls for the possibility that a strong legal environment in the host country could be driving our results.

Table 8 contains these results. When VDisc is the dependent variable, Host is not significant. When VDiscQ is the dependent variable, Host is positive and significant at the 0.10 level. Thus, this suggests that while the host country's legal environment does not affect the level of voluntary disclosures, it does have a positive impact on the quality of those disclosures. More importantly, our results for H1 and H2 are unchanged when Host is included. Thus, controlling for Host, we continue to find that voluntary disclosures increase as the firm becomes more global and that this increase is more pronounced for firms based in civil-law countries.

5.4. Robustness checks

We conduct additional robustness checks. First, we include an additional control variable for a U.S. listing since FList does not differentiate between U.S. and other foreign listings. There is a considerable literature that examines the effects of cross-listing in the

United States (e.g., Reese and Weisbach, 2002; Lang, and Lundholm, 1993; Lang et al., 2003; Doidge, 2004), and Khanna et al. (2004) find that a U.S. listing is positively related to the S&P's disclosure ratings for their sample of non-U.S. firms. Thus, we examine whether our globalization variable is simply proxying for a U.S.-listing effect. Second, to consider whether our results are driven by unspecified industry factors, we estimate Eq. (3) with fixed industry effects. Third, because financial firms have different disclosures from non-financial firms and because their disclosures are highly regulated, we re-run our tests with the financial firms omitted. Our results for these analyses (untabulated) are qualitatively the same as our main results. Fourth, we noted before that over 40% of the sample is composed of U.K. firms (25%) and Canadian (15.1%). Thus, it is possible that our results might be driven by country effects involving one or both of these countries. Thus, we estimate models based on two reduced samples, one where we delete the U.K. firms and one where we delete both the U.K. and Canadian firms. Again, our results are similar to the prior results; even with 40.1% of the sample omitted, we continue to find support for H1 and H2.²⁰ Fifth, since our dependent variables are positive by design and are constrained to a specific range, it is possible that the assumption of normality may be violated. If so, our OLS estimates may be inconsistent and inefficient. We find our results (untabulated) are robust when we estimate our main models using Tobit.

6. Conclusion

This study uses hand-collected data on disclosures and foreign activity for a sample of 643 non-U.S. firms from 30 countries. We find that voluntary disclosures are positively related to the degree of globalization and are negatively related to the interaction between globalization and the legal environment in the firm's home country. Our research suggests that globalization is an important variable that has been largely overlooked by prior cross-country studies that examine the effects of country-level institutions. This has significant implications for future research since firms are becoming increasingly global and markets are becoming more integrated.

Our results indicate that the effects of globalization are most pronounced for firms from weak legal environments. There are two non-mutually exclusive explanations. First, globalization can increase the benefits of disclosure by exposing firms from weaker legal environments to new markets where disclosure is more highly valued. Second, as firms from these countries globalize, they need to provide better disclosures to build trust and enhance their reputation. That is, because users unfamiliar with the firm may have concerns about the weak laws and institutions in the firm's home country and the poorer quality of its financial reporting, firms from weak legal environments have incentives to provide better disclosure to alleviate these concerns as they become more international.

We offer a few caveats. Most notably, our sample is biased toward long-lived surviving firms that report in English. This affects the generalizability of our results. Further, because of the labor intensity of collecting the data, we only can provide evidence from one period. As a result, we cannot be sure that our results are not time-specific. Finally, even though we

²⁰ We also examine the effect of countries with small representations by re-estimating our models with countries with five or fewer firms omitted. Our results are qualitatively unchanged.

conduct extensive searches, we cannot be certain that every item in our voluntary disclosure index is voluntary in every country in our sample.

Our research could be extended in several ways. First, our design could be extended to other types of investor-focused communications such as media releases or conference calls. Second, using a time-series analysis would help develop a stronger causal link between globalization and voluntary disclosures. Third, if finer proxies can be developed, one could explore the relative effects of capital, product, and labor market involvement on voluntary disclosures. Fourth, and perhaps most important, globalization could be included in other tests that use cross-country differences in legal environment as an explanatory variable. For example, it would be worth examining whether accounting properties such as conservatism are a function of both legal environment and globalization.

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Capitalization of R&D costs and earnings management: Evidence from Italian listed companies[☆]

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Abstract

The capitalization of research and development (R&D) costs is a controversial accounting issue because of the contention that such capitalization is motivated by incentives to manipulate earnings. Based on a sample of Italian listed companies, this study examines whether companies' decisions to capitalize R&D costs are affected by earnings-management motivations. Italy provides a natural context for testing our hypothesized relationships because Italian GAAP allows for the capitalization of R&D costs. Using a Tobit regression model to test our hypotheses, we show that companies tend to use cost capitalization for earnings-smoothing purposes. The hypothesis that firms capitalize R&D costs to reduce the risk of violating debt covenants is not supported.

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Keywords: Earnings management, Cost capitalization, R&D accounting, Earnings smoothing, Debt covenants, Italian companies

1. Introduction

In the current era of globalization, a highly relevant issue facing regulators, academics, and practitioners is the determination of an appropriate accounting treatment for research

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and development (R&D) costs. International Accounting Standards discuss accounting for R&D costs in IAS No. 38 “Intangible Assets” (IASB, 2004a,b). Paragraph 54 of this standard states that no intangible asset arising from research (or from the research phase of an internal project) shall be recognized as an asset; and that research expenses shall be expensed in the income statement when they are incurred. Concerning development costs, paragraph 57 states that an intangible asset arising from development (or from the development phase of an internal project) shall be recognized if, and only if, an entity can demonstrate all of the following: (a) the technical feasibility of completing the intangible asset so that it will be available for use or sale; (b) its intention to complete the intangible asset and use or sell it; (c) its ability to use or sell the intangible asset; (d) how the intangible asset will generate probable future economic benefits; (e) the availability of adequate technical, financial, and other resources to complete the development and to use or sell the intangible asset; and (f) its ability to measure reliably the expenditure attributable to the intangible asset during its development. Although IAS 38 allows companies to capitalize development costs, the inherent subjectivity of the validation process permits management to exercise discretion in deciding whether the conditions of IAS 38 have been satisfied. In essence, IAS 38 gives management considerable flexibility regarding the treatment of development costs.

US GAAP takes a stricter approach to the issue. SFAS No. 2—Accounting for Research and Development Costs (FASB, 1974)—requires that all R&D expenditures be expensed in the current period. The only exception to the full expensing rule is stated in SFAS No. 86. The exception relates to the capitalization of software development costs (FASB, 1985). At the international level, certain national accounting standards (e.g., those of Italy) allow flexibility for the capitalization of R&D costs when some conditions are satisfied. These are conditions similar to those required by IAS.

The capitalization of R&D costs has always been a controversial accounting issue. Supporters of capitalization report results suggesting that R&D is a long-lived asset that influences future profitability (e.g., Bublitz & Ettredge, 1989; Sougiannis, 1994; Ballester, Garcia-Ayuso, & Livnat, 2003). Also, R&D costs are positively related to market value (Hirschey & Weygandt, 1985; Shevlin, 1991; Sougiannis, 1994) and yield value-relevant information to investors (e.g., Aboody & Lev, 1998; Lev & Zarowin, 1999; Healy, Myers, & Howe, 2002; Monahan, 2005).

Supporters of expensing are fewer. They stress the lack of reliable evidence of future economic benefits (e.g., FASB, 1974; AIMR, 1993; Kothari, Laguerre, & Leone, 2002) or refer to the benefits of consistency and comparability, pointing out that such benefits trump the costs identified by the supporters of capitalization. Additionally, reliability and the risk of earnings-management policies are underscored by supporters of the most conservative accounting treatment. In particular, expensing is preferable to capitalization because it increases the objectivity of financial statements. That is, it eliminates the opportunity for managers to capitalize costs of projects that have low probabilities of success or to delay impairment of R&D assets (Nelson, Elliott, Tarpley, & Tarpley, 2003; Schilit, 2002).

The debate surrounding the most effective accounting method for R&D costs supplements other literature that examines the trade-off between relevance (i.e., the predictive ability) and reliability (i.e., the representative faithfulness) of accounting information (FASB, 1980; AICPA, 1994; IASB, 2004a,b). Thus far, empirical research on R&D costs has focused mainly

on the relevance side of the trade-off, while little has been written about the reliability side that is, the possibility that R&D costs are subject to earnings management.

However, a few studies have indeed shown that R&D expenditures are subject to real earnings management. In short, this means that companies cut their R&D investments in order to achieve their earnings goals (e.g., Perry & Grnaker, 1994; Bushee, 1998; Mande, File, & Kwak, 2000). But there is still a paucity of research that explores the motives behind the accounting treatment of R&D costs within a setting where flexibility is allowed. Testing whether companies engage in earnings management through R&D cost accounting can significantly contribute to the debate around the best treatment for such costs. This debate has recently been raised within the convergence project by US GAAP and IAS/IFRS. Illustrating that R&D cost capitalization is motivated by incentives to manipulate earnings would support the current U.S. GAAP position, which does not allow the capitalization of such costs. On the contrary, showing that companies do not use R&D cost accounting for earnings-management purposes would support the approach now stated by IAS/IFRS, in which capitalization is allowed under certain conditions.

This study contributes to this debate by providing empirical evidence on the motivations for R&D cost capitalization. We hypothesize that the decision to capitalize R&D expenditures is related to two primary motivations: income smoothing and debt contracting. We test our hypotheses using a sample of firms listed on the Milan Stock Exchange. Multivariate results indicate that firms use capitalization of R&D costs to smooth earnings, while there is no support for the debt-covenant hypothesis. These results are robust within a variety of firm characteristics, such as firm size, risk, opportunities for growth, profitability, governance characteristics, industrial membership, and time control.

The paper proceeds as follows. Section 2 introduces accounting in Italy and the institutional background relating to R&D accounting. Section 3 discusses the previous literature. Section 4 presents the hypotheses and is followed by the research methods in Section 5. Section 6 presents the results and Section 7 concludes the study.

2. R&D accounting in Italy

Italian accounting regulation has always allowed for some flexibility in the capitalization of R&D costs. This allowance is similar to that of IAS. Accounting for intangibles, including R&D costs, is regulated by *Principio Contabile n. 24* (Accounting Standard No. 24). This standard distinguishes three different types of R&D costs as follows:

- 1) "Basic research," which consists of studies, surveys, and experiments that do not refer to a specific project; this type of R&D cost is normally carried out for the general utility of a company (e.g., market research, updating, etc.);
- 2) "Applied research," which consists of studies, surveys, and experiments that refer to specific projects; and
- 3) "Development," which consists of the application of research results to specific materials, tools, products, and processes preceding production.

The costs for basic research are to be expensed in the income statement. However, costs related to applied R&D can be capitalized if the following conditions are met: a) the costs

refer to a project for the realization of a clearly defined product or process; b) the costs are identifiable and measurable; c) the project to which the costs refer is technically feasible; d) the company owns the necessary resources to complete and exploit the project; and e) the costs are recoverable through the revenues generated by exploiting the project.

It is evident that the conditions stated by the Italian accounting standards are similar to those stated by IAS for development costs. In fact, the definition of applied research under Italian standards also fits into the definition of development costs provided by IAS 38. The Italian standards differ from IAS in that they do not require R&D capitalization when the abovementioned conditions occur, leaving flexibility in the hands of the companies. However, this difference is more formal than substantive. Given the subjectivity in assessing the occurrence of some of the conditions, it seems that, even under IAS, companies that prefer immediate expensing can easily justify this approach even when the aforementioned conditions are met.

Concerning the amortization of R&D costs, the Italian accounting standards require that the amortization be carried out over a period of no longer than five years beginning from the moment the outcome (product or process) is ready to be used. The Italian Civil Code (art. 2426) states that the capitalization of R&D costs shall be authorized by the *collegio sindacale* (statutory auditors) and that it is not possible to pay dividends until there are enough retained earnings to cover the carrying amount of the capitalized R&D costs. This stipulation limits the incentive to capitalize R&D costs for the purpose of increasing the amount of dividends paid. The Civil Code also requires that R&D activities be discussed in the *relazione sulla gestione* (management discussion and analysis section); however, there is no clear requirement as to what quantitative or qualitative disclosures should be relayed with regard to the capitalization of R&D costs. Finally, the Civil Code states that information regarding the amortization schedules of such R&D costs be provided in the explanatory notes of the financial statements.

3. Earnings management and specific accruals

Earnings management is defined as a “purposeful intervention in the external financial-reporting process, with the intent of obtaining some private gain” (Schipper, 1989, p. 92). In generally accepted terms, earnings management occurs “when managers use judgment in financial-reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers” (Healy & Wahlen, 1999, p. 368).

The large amount of research carried out thus far indicates that managers exercise discretion and manage earnings using a wide variety of methods, ranging from carrying out special transactions (so-called real earnings management) to the manipulation of accruals. Several of the main incentives for earnings management include debt covenants, bonus plans, and income smoothing. The debt-covenant hypothesis suggests that managers have an incentive to manage earnings in order to avoid violating covenants in debt contracts, which are typically stated in terms of accounting numbers or ratios. The bonus-plan hypothesis suggests that managers manage earnings in order to maximize compensation. Healy (1985) shows that managers tend to reduce earnings if they fall either above or below

bonus-plan bounds. In contrast, they tend to increase earnings when they fall between the two bounds. Finally, the income-smoothing hypothesis suggests that firms aspire to reduce earnings fluctuations.

Empirical earnings-management studies find support for the abovementioned motives in a variety of contexts. Many of these studies test the relationship between aggregate accruals and incentives for earnings management (e.g., Healy, 1985; DeAngelo, 1986; Jones, 1991; Dechow, Sloan, & Sweeney, 1995). As an alternative approach, other studies focus on single items, suggesting that income from specific accruals is related in a systematic way to earnings-management incentives. Among these latter studies, McNichols and Wilson (1988) show that companies manage their bad-debt provisions according to the bonus-plan hypothesis (Healy, 1985). Zucca and Campbell (1992) examine discretionary asset write-downs, showing that companies use these accruals either for “big bath” strategies or for earnings smoothing. Francis, Hanna, and Vincent (1996) confirm that earnings-management incentives play a significant role in explaining goodwill write-offs and restructuring charges. Other studies focus on allowances for deferred taxes (e.g., Miller & Skinner, 1998; Schrand & Wong, 2003). These studies provide mixed results. Finally, Dowdell and Press (2004) analyze the in-process R&D write-offs, but they do not find evidence to support their bonus-plan hypothesis.

In line with the aforementioned studies on earnings management and specific accruals, this study aims at testing whether the decision to capitalize or to expense R&D costs (when flexibility exists) is affected by earnings-management motives.

4. Hypotheses development

Previous research investigates three main incentives for earnings management: earnings smoothing, debt covenant, and bonus-plan incentives. In this study, we focus on the first two since disclosure of data on the existence and structure of bonus plans by Italian companies is limited.¹

The income-smoothing hypothesis suggests that a manager’s accounting discretion is driven by his or her desire to reduce income-stream variability (Fudenberg & Tirole, 1995). The process of smoothing serves to moderate year-to-year fluctuations in income by shifting earnings from peak years to less successful periods. This process lowers the peaks and makes earnings fluctuations less volatile (Copeland, 1968).

Income smoothing has been viewed both as a positive strategy, whereby managers transmit private information to investors (e.g., Gordon, 1964; Beidleman, 1973; Ronen & Sadan, 1981; Tucker & Zarowin, 2006), and as a manipulative practice driven by opportunistic aims (Gordon, 1964; Imhoff, 1977; Kamin & Ronen, 1978). In this study, we do not intend to argue for either one of these two views. Rather, we test whether R&D cost capitalization is used for purposes of earnings smoothing.

Several explanations for earnings smoothing have been posited by prior studies. Some of these explanations are related to capital-market incentives. Several authors suggest that since current earnings are used as predictors for future earnings, managers have an incentive

¹ Under the Italian regulation, companies have to provide only very general and aggregate figures regarding executive compensation—hence our inability to examine this potentially interesting incentive.

to smooth income as a signalling technique in order to deliver private information to the market (Ronen & Sadan, 1981; Chaney & Lewis, 1995; Hunt, Moyer, & Shevlin, 1996). Other authors stress that a primary motivation for earnings smoothing is to reduce perceived risk by investors. Earnings variability is interpreted as an important measure of the overall risk of a firm and has a direct effect on investors' capitalization rates – and thus has an adverse effect on the value of a firm's shares (e.g., Wang & Williams, 1994; Barth, Landsman, & Wahlen, 1995; Gebhardt, Lee, & Swaminathan, 2001).

Other explanations for income smoothing have been related to the existence of contracts linked to accounting numbers. Trueman and Titman (1988) suggest that income smoothing practices reduce debtholders' perceptions of a firm's risk of bankruptcy, and thereby translate into a lower cost of capital for the firm. Political costs are also considered to be an important motivation for earnings smoothing (Watts & Zimmerman, 1986; Wong, 1988; Cahan, 1992; Godfrey & Jones, 1999). Income smoothing averts attention from "excessive" high earnings that might attract adverse political attention. It also avoids concerns which arise from low operating profits. Such concerns could come from employees concerned about future employment prospects, from suppliers and customers assessing future stability, or from governments that are investigating unviable industries.

Another primary explanation for earnings smoothing has been related to managers' compensation and concerns over job security. Fudenberg and Tirole (1995) predict that income smoothing occurs because the manager boosts the reported income in bad times in order to raise the probability of keeping his job and tends to decrease reported income in good times since "information decay" causes good current performance to be weighted less in future performance. This expectation partially contradicts Healy's (1985) hypothesis on bonus plans, according to which managers tend to decrease earnings (i.e., "take a big bath") when they are below the lower bound stated by the plans. However, more recent empirical studies have contradicted the validity of Healy's hypothesis (Gaver, Gaver, & Austin, 1995; Holthausen, Larcker, & Sloan, 1995; Dowdell & Press, 2004),² suggesting that the existence of bonus plans does not significantly affect the earnings-smoothing incentive.

The empirical evidence provided so far generally supports the existence of earnings smoothing (e.g., Ronen & Sadan, 1981; Moses, 1987; Young, 1998; Chaney, Jeter, & Lewis, 1998; Buckmaster, 2001). For empirical purposes, the income-smoothing hypothesis has usually been characterized as the propensity of managers to choose accounting policies that increase (decrease) reported earnings when current period pre-managed earnings are below (above) the profitability measure of prior years. Consistent with earlier studies (Barnea, Ronen, & Sadan, 1976; Moses, 1987; Godfrey & Jones, 1999), we use operating profitability as the income-smoothing target.

While there is general support for the hypothesis that companies use accruals to smooth earnings, there is no clear evidence about the use of R&D cost capitalization for such purpose. However, a survey by Nelson et al. (2003) shows that cost capitalization is one of the most common earnings-management strategies. Therefore, we expect companies tend toward the capitalization of more R&D costs when their operating profitability (before

² For possible explanations regarding the lack of empirical support of the bonus-plan hypothesis, see Dechow and Schrand (2004).

R&D capitalization)³ is below the level of the past years, while they tend toward expensing R&D costs when their operating profitability is above the level of that of past years. We formulate the following hypothesis:

H1. There is a negative relationship between change in firm profitability and R&D capitalization.

The second hypothesis is based on implications of the literature regarding agency theory (Jensen & Meckling, 1976). This literature suggests that contracts between debtholders and owner-managers contain covenants restricting management behavior in order to prevent actions from being taken that may negatively affect the debtholders' wealth position. Many such debt agreements rely on the accounting numbers. To the extent that the accounting standards allow flexibility in the choice of accounting methods, managers have an opportunity to choose those procedures that allow them to avoid violating restrictive debt covenants—specifically methods that increase income. Even if default cannot be avoided by manipulation of accounting information, managers are still expected to make asset- and income-increasing accounting choices in the hope of improving their bargaining position in the event of renegotiation (DeFond & Jambalvo, 1994). Extant empirical evidence on the debt-covenant hypothesis is mixed (e.g., DeAngelo, DeAngelo, & Skinner, 1994; Sweeney, 1994; DeFond & Jambalvo, 1994).

The most frequently used proxy to test the debt-covenant hypothesis is the leverage ratio (e.g., Hunt, 1985; El Gazzar, Lihen, & Pastena, 1986; Watts & Zimmerman, 1986; Rusbarsky, 1988). A number of studies are specifically dedicated to test whether the leverage ratio is able to reliably proxy for debt-covenants tightness (Duke & Hunt, 1990; Press & Weintrop, 1990). The majority of these studies support the use of the leverage ratio.

The debt-covenant hypothesis suggests that managers of more leveraged companies have stronger incentives to make income-increasing accounting decisions, e.g.—in our case—to capitalize more R&D costs. Such capitalization “loosens” debt-covenant restrictions in two ways. First, if debt covenants are based on measures of profitability, then capitalization will increase earnings. Second, if the debt covenant is based on the ratio of total debt to assets, then capitalization will lower this ratio. Of course, this is true under the assumption that lenders do not adjust a firm's earnings and total assets by excluding the effects of the capitalization (Duke & Hunt, 1990). Thus, our second hypothesis is formulated as follows:

H2. There is a positive relationship between a company's financial leverage and its R&D capitalization.

5. Research methodology

5.1. Sample selection

Under Italian disclosure rules, all firms that undertake R&D activities during a fiscal year have an obligation to report such activities in the management's discussion and

³ By “before R&D capitalization” we mean before the effects of the capitalized R&D costs, net of the related amortization.

analysis section (MD&A) of their annual reports. Therefore, we searched the annual reports of all non-financial firms listed on the *Borsa Valori di Milano* (Milan Stock Exchange) that disclosed R&D activities for the years 2001, 2002, and 2003. We hand-collected and analyzed the original financial statements since electronic databases did not report all the information required for our analysis.⁴ Unfortunately, even using the original documents, we were unable to collect the complete set of information needed. This was because many companies did not specify the amount of total R&D expenditures or R&D capitalization, or they provided only aggregate data for R&D and advertising expenditures.⁵ We found a total of 130 firm-years that disclosed data needed for our statistical analysis across the sample period (43, 43, and 44 firms for the years 2001, 2002 and 2003 respectively). In our regression model (discussed in section 6.2), we require lagged data to be available for each firm. Hence, in our statistical tests, we use 86 observations related to 43 unique firms.

5.2. Variables

For each firm in our sample, we calculated a number of variables to be used in the statistical tests. Our variable of interest is the R&D capitalization variable, Capitalization, which is calculated as total R&D capitalization (net of the yearly depreciation) divided by the total assets of the firm.⁶ To test our first hypothesis, we use ChROA, which is the change in return on assets over the average of the previous two fiscal years. Later, we also report results on a simple year-to-year change in ROA.⁷ What we test is whether the accounting treatment of R&D is used in conjunction with other techniques to reach earnings goals.

To test our second hypothesis (i.e., the relationship between firm debt and Capitalization), we calculated Leverage, which is a firm's total debt divided by total assets (calculated before the effect of R&D capitalization). Additionally, in order to examine the effects of earnings-management incentives on capitalized R&D costs, we included in our statistical tests a number of control variables that had previously been linked to R&D capitalization (see Aboody & Lev, 1998). Our first control variable is the total amount of R&D expenditures undertaken by the firm divided by total assets in the current fiscal year, R&Dtotal. It is reasonable to expect a relationship between the amount of total

⁴ We could not collect data prior to 2001 since full annual reports for most Italian companies are available only for the last five years.

⁵ According to Italian law, capitalized R&D costs and advertising costs are included on the same item in the legal balance sheet format.

⁶ The choice of total assets as a deflator is due to a number of reasons. First, it provides for a direct relationship to firm leverage (a variable of interest in this study), it also is in line with other earnings-management studies, as the original Jones (1991) study deflates accruals by total assets. A possible alternative could be deflating by income in order to provide a clearer relationship with firm earnings. However, this tactic would require the exclusion of firm-years with negative earnings, which could bias the results. Finally, to deflate by total R&D expenditures is not theoretically desirable, since a firm that capitalizes a large (small) percentage of its R&D might lead to no significant (a large) impact on earnings. An example of this is large, non R&D intensive firms capitalizing most of their R&D expenditures. In this case, the percentage of R&D capitalized would be high while impact on earnings would be small. Later, we include the total expenditures in R&D as a control variable in our model.

⁷ In the calculation of ChROA, current ROA is assumed "pre-managed" (that is to say, the ROA before the effects of R&D capitalization). We are aware that companies use several earnings management mechanisms (not solely R&D cost capitalization) in order to reach their goals. Therefore, we do not assume that our "pre-managed" ROA is unaffected by other earnings-management policies.

R&D investments undertaken by the firm and the amount of capitalization. On one side, the higher a firm's total R&D investments, the higher the probability that a larger portion of the undertaken R&D meets the conditions stated by the standards. But it should be pointed out that the standards allow flexibility in this decision—even when all the above-mentioned conditions are present. Moreover, for companies undertaking a large number of R&D projects (which companies are typically those that have a higher R&Dtotal), checking whether the conditions required by the standards are met is more difficult than for companies undertaking only a few small projects. Therefore, we included R&Dtotal as a control variable—without having any *ex ante* prediction concerning its relationship to Capitalization.

Our second control variable is related to the profitability of the firm. Current profitability can be considered an indirect control for the existence of the economic resources necessary to complete and exploit the project. It should be pointed out, however, that the relationship between current profitability and the extent of the capitalization of R&D costs can be at least partially affected by earnings-management purposes. Companies can be motivated to capitalize R&D costs when their current profitability is either negative or low in order to improve their accounting performance. Similarly, companies with high profitability can be motivated to expense R&D costs in order to reduce political costs. These two effects suggest a negative relationship between current profitability and the level of R&D cost capitalization. On the other hand, current profitability can also be considered a proxy for expected future profitability (see McNichols & Wilson, 1988; Francis et al., 1996; Miller & Skinner, 1998). Expected future-operating profitability can be considered a strong rationale for the company to successfully recover its capitalized costs. We expect that the higher the future profitability, the higher the probability that the last condition required by the accounting standards—that companies can recoup the capitalization through expected increases in revenues—will be met. Therefore, we expect a positive relationship between future-operating profitability and the extent of capitalized R&D costs. In order to control for all these effects, we introduced ROA as a control variable of a firm's profitability, measured as the firm's operating income (before R&D capitalization) divided by the firm's total assets.

We use firm size as a control for firm visibility, political costs and media attention (Watts & Zimmerman, 1986; Bhushan, 1994). We proxy for firm size by calculating the natural logarithmic form of the firm's total assets, Logassets. We also control for the materiality of the capitalization by calculating High-Capitalizer: a dummy variable equal to one if the amount capitalized (normalized by the absolute value of earnings) is above the median for capitalizing firms. Moreover, we control for the amount of capitalized R&D during the prior year by calculating LagCapitalization,⁸ which is equal to Capitalization of the prior year.⁹ Not controlling for the prior year's capitalization represents a serious, correlated, omitted variable.¹⁰ Therefore, in our statistical analysis, we eliminated all firms that do not have capitalization data for the prior year, reducing our final sample size to 86. We also calculated MB, which is the market value of equity divided by its book value, as a control for future growth opportunities. Beta is included in our multivariate analysis as a control for

⁸ The Durbin Watson statistic and the calculated first-order autocorrelation indicate that we do not have problems of serial correlation between Capitalization and LagCapitalization.

⁹ Results remain unchanged if we use a 1/0 dummy variable.

¹⁰ For a similar treatment, see Boone, Field, Karpoff, and Raheja (2007).

Table 1
Comparison of selected characteristics of sample firms to all firms available through Datastream for the year 2003

	Sample firms	All firms		<i>t</i> -test	Wilcoxon
# Observations	42	182			
Variable	Mean	Mean	Difference	<i>Pr</i> > <i>t</i>	<i>Pr</i> > <i>z</i>
ROA	0.046	0.018	0.028	0.13	0.21
ChROA	−0.060	0.008	0.068	0.45	0.68
Assets	913 million	364 million	549 million	0.09	0.02
Leverage	0.624	0.631	0.007	0.82	0.84

ROA is measured as the firm's operating income divided by the total assets of the firm. ChROA is the change in return on assets over the average of the prior two fiscal years. Assets is the total assets of the firm at fiscal year-end. Leverage is total debt divided by total assets.

firm risk. Finally, all multivariate analyses include controls for years and for industrial membership based on the Milan Stock Exchange classification.

6. Data analysis and results

6.1. Sample statistics, descriptives, and univariate analysis

In Table 1, we compare our sample firms to the population of non-financial firms listed on the Milan Stock Exchange to see whether our sample firms are biased on certain dimensions.

We compare our sample firms for the year 2003 with all firms whose data are available through Datastream.¹¹ We see that both sample firms and control firms are of about equal leverage, profitability, and change in profitability. The only difference is that our sample firms are larger in size. This difference in size of sample firms is an expected occurrence, as we are studying R&D issues. Since size is the only firm characteristic that is different between our sample firms and the population of firms listed on the Milan Stock Exchange, and since we specifically control for firm size in our statistical tests, selection bias does not appear to be a concern. Also, in our tests, we control for a variety of additional firm and institutional characteristics (e.g., governance and ownership structure, firm risk and growth opportunities, etc.).

Table 2 presents the descriptive statistics for our sample of 86 firms. Mean Capitalization is 0.19%, with 0.69% being capitalized at the final decile (ninetieth percentile). In general, firms spend an equivalent of 2.1% of their total assets on R&D, with the largest decile being 5.2% for the most research-intensive firms. Comparing Capitalization to R&Dtotal, we find that firms capitalize roughly 10% of their R&D expenditures. In general, the firms are profitable, with an average ROA of about 4.4% and with a decrease in their profitability from the average of the prior two years to about −4.7%. The firms are levered at about 50%.

¹¹ We make comparisons for 2003 only, since including 2001 and 2002 would bias the comparisons by examining data across multiple years. Using Datastream data for both the sample and the other companies avoids the risk of inconsistent calculations between the two samples. In relation to year 2003, Datastream reports data on 42 out of 43 sample firms and on a total of 182 firms listed on the Milan Stock Exchange.

Table 2
Descriptive statistics on selected variables

Variable	Mean	Median	SD	P10	P90
Capitalization	0.002	0.000	0.004	0.000	0.007
R&Dtotal	0.021	0.013	0.023	0.001	0.062
ROA	0.044	0.045	0.076	−0.018	0.120
ChROA	−0.047	−0.046	0.061	−0.120	0.004
Leverage	0.512	0.559	0.157	0.281	0.714
Assets	1.33 billion	513 million	2.68 billion	62 million	67 billion

P10 (P90) signifies the tenth (ninetieth) percentile of the variable distribution. Capitalization is total R&D capitalization (net of the yearly depreciation) divided by the total assets of the firm. R&Dtotal is the total investment in R&D undertaken by the firm divided by total assets. ROA is measured as the firm's operating income (before capitalization) divided by the total assets of the firm. ChROA is the change in return on assets (before capitalization) over the average of the prior two fiscal years. Leverage is total debt divided by total assets (before capitalization). Assets is the total assets of the firm at fiscal year-end.

indicating that debt financing is a prime source of funds. As concerns their size, the firms are relatively large, with about 1.3 billion euros in assets.

Since we examine R&D capitalization as a means of earnings management, we provide descriptive statistics disaggregated by industry in Table 3. Since our sample-selection procedure involves gathering data on all firms that report R&D activities, our sample contains a broad representation spread across many industries. The majority of R&D activity is conducted by new economy, electronics, and automotive firms. A smaller amount of R&D transpires in utilities firms. In terms of capitalized R&D, the plants & machinery and automotive industries have larger capitalization rates as compared to the textile industry.¹²

In Table 4 we conduct both parametric *t*-tests and non-parametric Wilcoxon rank-sum tests in order to examine differences between capitalizing and non-capitalizing firms. We see that at the univariate level, without controlling for multivariate effects, capitalizing and non-capitalizing firms have similar levels of change in profitability and firm size while they have different levels of leverage. In particular, capitalizing firms are more highly levered. R&Dtotal is larger in the non-capitalizing group (statistically significant at 0.01 and 0.10 in the *t*-test and Wilcoxon test, respectively). This is an interesting observation because it indicates that capitalization is not a simple function of a firm's R&D activities. This result, combined with results in Table 3, suggests that alternate underlying motivations could be involved.

Table 5 presents the table of correlations (Pearson). Here, we see that ChROA is negatively related to Capitalization, even though the level of significance is not particularly high ($P = 0.10$), while Leverage shows no significant correlation. Capitalization is also not related to R&Dtotal, and is only marginally and negatively related to Assets. The only variable showing a significant correlation is ROA, which is negatively related to Capitalization ($P < 0.01$). In

¹² Inspecting Table 3 is interesting because there are two main patterns that can be observed. Examining means and medians, we find a large variability between industries in terms of both the R&D undertaken and the ensuing capitalization. This finding provides confidence that our ensuing statistical analysis is not driven by industrial patterns.

Table 3
Descriptive statistics on R&D capitalization variables, by industry

Industry	N	Variable	Mean	Median	SD
Automotive	8	R&Dtotal	0.022	0.022	0.005
		Capitalization	0.007	0.004	0.010
Chemicals	14	R&Dtotal	0.015	0.018	0.013
		Capitalization	0.000	0.000	0.000
Electronics	14	R&Dtotal	0.024	0.019	0.023
		Capitalization	0.001	0.000	0.002
Media	6	R&Dtotal	0.003	0.004	0.001
		Capitalization	0.000	0.000	0.001
Metals and oil	2	R&Dtotal	0.015	0.014	—
		Capitalization	0.006	0.007	—
New Economy	14	R&Dtotal	0.048	0.059	0.034
		Capitalization	0.003	0.000	0.006
Plants and machinery	8	R&Dtotal	0.003	0.001	0.004
		Capitalization	0.020	0.012	0.021
Textile	4	R&Dtotal	0.008	0.011	0.007
		Capitalization	0.000	0.000	0.000
Utilities	8	R&Dtotal	0.002	0.002	0.001
		Capitalization	0.000	0.000	0.000
Miscellaneous	8	R&Dtotal	0.007	0.004	0.010
		Capitalization	0.011	0.006	0.010

Capitalization is total R&D capitalization (net of the yearly depreciation) divided by the total assets of the firm. R&Dtotal is the total investment in R&D undertaken by the firm divided by total assets.

sum, we see that at the univariate level, there is some (even if not overtly clear) support for H1 and H2, as Capitalization is negatively related to ChROA, while Leverage is higher for capitalizing firms in the Wilcoxon and *t*-tests. However, these results should be interpreted with caution as at the univariate level we do not control for cross-correlations (e.g., size is significantly related to three of our variables), and we do not control for industry membership, etc. Therefore, we next turn our attention to the more formal multivariate regressions.

Table 4
Univariate small-sample tests examining differences among capitalizing and non-capitalizing firms

Variable	Non-capitalizing firms	Capitalizing firms	Difference	<i>t</i> -test	Wilcoxon
	Mean	Mean		<i>Pr</i> > <i>t</i>	<i>Pr</i> > <i>z</i>
R&Dtotal	0.027	0.014	0.013	0.01	0.07
ROA	0.052	0.035	0.017	0.28	0.45
ChROA	−0.052	−0.041	−0.011	0.30	0.25
Assets	1.11 billion	1.17 billion	59 million	0.80	0.60
Leverage	0.469	0.573	0.104	0.01	0.01
# of obs.	44	42			

R&Dtotal is the total investment in R&D undertaken by the firm divided by total assets. ROA is measured as the firm's operating income before capitalization divided by the total assets of the firm. ChROA is the change in return on assets over the average of the two prior fiscal years. Leverage is total debt divided by total assets before capitalization. Assets is the total assets of the firm at fiscal year-end.

Table 5
Pearson correlations among selected variables

	Capitalization	R&Dtotal	ROA	ChROA	Leverage
R&Dtotal	0.054 (0.61)				
ROA	-0.362 (<0.01)	-0.291 (<0.01)			
ChROA	-0.178 (0.09)	0.103 (0.33)	-0.786 (<0.01)		
Leverage	0.069 (0.50)	-0.119 (0.36)	0.008 (0.90)	0.072 (0.46)	
Assets	-0.194 (0.06)	-0.323 (<0.01)	0.276 (<0.01)	-0.151 (0.32)	0.243 (<0.05)

Correlation coefficient is reported in each cell, significance level is in the parenthesis.

Capitalization is total R&D capitalization (net of the yearly depreciation) divided by the total assets of the firm. R&Dtotal is the total investment in R&D undertaken by the firm divided by total assets. ROA is measured as the firm's operating income before capitalization divided by the total assets of the firm. ChROA is the change in return on assets over the average of the prior two fiscal years. Leverage is total debt divided by total assets (before capitalization). Assets is the total assets of the firm at fiscal year-end.

6.2. The regression model

Since Capitalization is a left-truncated variable—i.e. companies that don't capitalize R&D have Capitalization = 0, while companies that capitalize have a positive value of less than one—we use a Tobit regression for our analysis (see Kennedy, 2003).¹³ The statistical equation has the following general form (the subscript *i* denotes each firm in our subsample, as does *t* for multiple time periods):

$$\begin{aligned} \text{Capitalization}_{it} = & b_0 + b_1 \text{ChROA}_{it} + b_2 \text{Leverage}_{it} + b_3 \text{R\&Dtotal}_{it} + b_4 \text{ROA}_{it} \\ & + b_5 \text{Logassets}_{it} + b_6 \text{MB}_{it} + b_7 \text{Beta}_{it} + b_8 \text{HighCapitalizer}_{it} \\ & + b_9 \text{LagCapitalization}_{it} + \text{Industry Controls} \\ & + \text{Year Dummies} + u_{it} \end{aligned}$$

Per H1 and H2, we expect the coefficients on b_1 and b_2 to be negative and positive, respectively.

Model 1 of Table 6 presents the tests on H1 and H2. We see that, as predicted by H1, ChROA is negative and significant, indicating that the higher (lower) the profitability this year compared to the average of the previous two years, the smaller (larger) the amount of capitalized R&D expenditures. For H2, we see that, inconsistent with our predictions, Leverage is not significant. A possible interpretation of this result is that debt covenants are structured so that companies are not motivated to capitalize costs in order to avoid covenants violation. Actually, debt covenants are often designed so that reported earnings and total assets are adjusted to eliminate the effects of particular accounting treatments, such as cost capitalization (see Duke & Hunt, 1990).

Regarding our control variables, we find that R&Dtotal is insignificant ($P < 0.96$), indicating that the amount of capitalized R&D is not a function of a firm's R&D expenditures. This insignificant relationship between R&D expenditures and capitalization indicates that a firm's decision to capitalize is independent of its R&D functions; rather, it could signify that the decision to capitalize is related to other firm characteristics. Concerning ROA, we find a significant negative relationship with Capitalization, indicating

¹³ Using OLS regression instead of the Tobit model does not qualitatively affect our inferences.

Table 6
Tobit regression analysis examining the relationship between R&D capitalization and hypothesized variables

Dependent variable: Capitalization

Parameter	Model 1		Model 2	
	Estimate	<i>Pr > t </i>	Estimate	<i>Pr > t </i>
Intercept	0.004	0.42	0.005	0.30
ChROA	−0.021	0.01		
ChROA-2			−0.023	0.01
Leverage	−0.002	0.27	−0.002	0.26
R&Dtotal	0.001	0.96	0.003	0.84
ROA	−0.027	0.01	−0.010	0.065
Logassets	−0.000	0.37	−0.000	0.32
MB	0.001	0.04	0.000	0.12
Beta	0.001	0.22	0.001	0.17
High-Capitalizer	0.007	0.01	0.008	0.01
LagCapitalization	0.180	0.01	0.190	0.01
<i>N</i>		86		86
Schwartz Criterion		−707		−706
Pseudo <i>R</i> -squared		0.73		0.67

Capitalization is total R&D capitalization (net of the yearly depreciation) divided by the total assets of the firm. ChROA is the change in return on assets (before capitalization) over the average of the prior two fiscal years. ChROA-2 is the change in return on assets (before capitalization) over the previous fiscal year. Leverage is total debt divided by total assets (before capitalization). R&Dtotal is the total investment in R&D undertaken by the firm divided by total assets. ROA is measured as the firm's operating income before capitalization divided by the total assets of the firm. Logassets is the logarithmic transformation of the total assets of the firm at fiscal year-end. MB is the market value of equity divided by the book value. Beta is the sensitivity of the asset's returns to market returns. High-Capitalizer is a dummy variable equal to one if the amount capitalized (normalized by the absolute value of earnings) is above the median for capitalizing firms. LagCapitalization is equal to Capitalization of the prior year. Dummy variables for year and industry membership are not reported.

that more profitable (unprofitable) firms capitalize less (more) of their R&D expenditures. If we considered ROA as an indicator of the financial health of the company and of the availability of economic resources necessary to complete and exploit the project, or alternatively as an indicator of future expected profitability, we would expect a positive relationship. Instead, it seems that R&D cost capitalization is used to counterbalance high or low earnings, which indirectly confirms that such capitalization is used for earnings-smoothing purposes, as stated by H1. An alternative possible explanation is that companies tend to reduce political costs arising from too high or too low profitability, or that more profitable companies tend to invest in higher risk development projects, which typically do not meet one or more of the conditions required for the capitalization, while less profitable companies tend to invest in projects whose result is more predictable and less risky and, therefore, more likely to meet the conditions stated by the standards. In relation to the other control variables, we note that firm size is not related to R&D capitalization and that opportunities for firm growth are positively related to R&D capitalization, indicating that firms that are expected to grow are more likely to capitalize—perhaps because they face more pressure to provide a positive outlook on firm performance or because growth firms are more likely to meet the conditions of capitalization. High-Capitalizer, as expected, is

positively related to Capitalization, possibly due to a mechanical effect or because the higher the effect of capitalization on earnings, the more likely that a capitalization decision will be made. LagCapitalization is also positively related to Capitalization, since firms are expected to take capitalization decisions with uniformity, and firms that previously capitalized are more likely to capitalize again, otherwise risking a dip in reported performance. Regarding the statistical diagnostics, we see that the Schwartz Criterion is -707 , indicating that the Tobit algorithm has converged and our model is well specified. The pseudo R -squared of 73% indicates that the dependent variable is explained well by our regressors.

In Model 2, we utilize an alternative specification of change in profitability: ChROA-2. This is calculated as the year-to-year change in profitability. We perform this action because managers (or the market) could perceive change in profitability either as a change of “base” profits (calculated as the average of the prior two years) or as a change from the last earnings figure. ChROA-2 is still highly significant. However, the adjusted R -squared drops by about six percentage points, providing some evidence that changes over a “base” profit number calculated as the change in profitability over the average of the prior two years are more important in the income smoothing decision as opposed to the yearly change in profitability. All in all, the results in Table 6 provide support for H1 but not for H2. The results are especially robust because in a small sample—after controlling for year and industrial effects, for the materiality of the capitalization and for the prior year capitalization—the change in profitability is consistently significant and is in the expected direction.

In Table 7, we undertake a number of robustness tests in order to supplement our main findings. Our first test introduces a dummy variable that tests for earnings thresholds. Specifically, it controls if R&D capitalization is able to turn a negative ROA into a positive one. Our second test replicates our main regression model (Table 6) with the addition of a number of variables that control for characteristics of firm corporate governance. Finally, our last robustness test involves a larger sample drawn from Datastream and is limited to the variables available on that database. In each of the above tests, our results indicate that our income smoothing hypothesis is robust to earnings thresholds and various governance characteristics; it is not idiosyncratic to our sample and it is extended over multiple years.

More specifically, in Model (1) of Table 7 we replicate our multivariate analysis with the addition of a new variable, *Manage*, which is a dummy variable equal to one if capitalization helps a firm achieve a positive change in ROA from a negative one. We carry out this analysis because a firm could expense R&D even if it is below its target, i.e., it is below the average earnings level of the prior two years. This could be the case when achieving an increase in profitability is not attainable. We expect this dummy variable to have a positive relationship with Capitalization, since prior research identifies benchmark beating as a motivation for earnings management (e.g., Burgstahler & Dichev, 1997). Controlling for *Manage* enables us to test whether the inability to beat the benchmark affects the income-smoothing motivation, allowing a better test of H1.

As expected, our results indicate that *Manage* is significantly and positively related to Capitalization, indicating that a firm's decision to capitalize is motivated by profitability concerns, that is to increase profit. Additionally, our original performance variable ChROA is significant ($P = 0.04$) in the hypothesized direction, indicating that the incentive to smooth earnings still holds after controlling for benchmark-beating ability.

Table 7

Tobit regression analysis examining the relationship between R&D capitalization and hypothesized variables and other control variables

Parameter	Model 1		Model 2		Model 3	
	Estimate	<i>Pr > t </i>	Estimate	<i>Pr > t </i>	Estimate	<i>Pr > t </i>
Intercept	0.001	0.77	0.003	0.70	−0.000	0.85
ROA	−0.023	0.01	−0.012	0.14	0.005	0.09
ChROA	−0.014	0.04	−0.037	0.01	−0.016	0.01
Manage	0.008	0.01				
Leverage	−0.002	0.25	0.002	0.71	0.002	0.17
R&Dtotal	−0.007	0.62	−0.059	0.06		
Logassets	0.000	0.96	−0.000	0.27	−0.000	0.77
MB	0.001	0.04	0.000	0.41		
Beta	−0.000	0.98	0.002	0.38		
High-Capitalizer	0.007	0.01	0.009	0.01	0.010	0.01
LagCapitalization	0.087	0.16	0.193	0.07	0.495	0.01
BoardSize			0.000	0.42		
Family			−0.002	0.06		
BIndependence			0.005	0.07		
Largest-Owner			−0.000	0.93		
N	86		86		890	
Schwartz Criterion	−719		213		−3431	
Pseudo R-squared	0.71		0.69		0.66	

Model (1) Controls for the ability to reach positive earnings through capitalization. Model (2) adds a number of control variables related to corporate governance characteristics. Model (3) tests the hypothesized variables on a larger sample drawn from Datastream, using Capitalization-2 (which is an approximation of Capitalization) as the dependent variable.

Capitalization is total R&D capitalization (net of the yearly depreciation) divided by the total assets of the firm. ChROA is the change in return on assets (before capitalization) over the average of the prior two fiscal years. Manage is a dummy variable equal to one if capitalization helps a firm achieve a positive change in ROA (from a negative one). Leverage is total debt divided by total assets (before capitalization). R&Dtotal is the total investment in R&D undertaken by the firm divided by total assets. ROA is measured as the firm's operating income before capitalization divided by the total assets of the firm. Logassets is the logarithmic transformation of the total assets of the firm at fiscal year-end. MB is the market value of equity divided by the book value. Beta is the sensitivity of the asset's returns to market returns. High-Capitalizer is a dummy variable equal to one if the amount capitalized (normalized by the absolute value of earnings) is above the median for capitalizing firms. LagCapitalization is equal to Capitalization of the prior year. BoardSize is the number of board members. BIndependence is the fraction of independent directors sitting on a board. Largest-Owner is the fraction of shares owned by the largest owner. Family is a dummy variable equal to one if a firm is family controlled or family influenced, zero otherwise. Dummy variables for year and industry membership are not reported.

In Model (2) of Table 7, we explicitly control for firm-governance characteristics. Specifically, we control for firm-ownership structure, whether a firm is family controlled, the proportion of independent directors on the board, and board size. We control for ownership structure by calculating the percentage of shares owned by the largest shareholder (Largest-Owner). This is done because concentrated ownership by a single dominant shareholder creates a unique set of agency problems; this characteristic is prevalent in the Italian capital market system. Brunello, Graziano, and Parigi (2003, p.1029) document that “in more than half of listed firms (on the Milan Bourse) one shareholder owns the absolute majority of common shares.” Concentrated ownership

makes the agency relationship between owners and managers less critical, but raises a new agency problem between the controlling shareholders and the minority ones. Fan and Wong (2002) argue that concentrated ownership limits the flow of accounting information to outside investors, and that this limitation translates into greater opportunities for earnings management. Introducing Largest-Owner as a control variable allows us to control for this potentially relevant governance characteristic.

We also control for family ownership by employing a dummy variable, Family, if the firm is majority owned (or heavily influenced) by a family.¹⁴ This action is taken since several Italian firms are controlled (or strongly influenced) by one or more closely related families. This characteristic presents a unique situation that also extends to financial-reporting decisions. Prior studies (Chen & Radhakrishnan, 2005; Wang, 2006) found that family ownership, *ceteris paribus*, is associated with higher earnings quality. This association is attributed both to the ability of family firms to monitor and curtail opportunistic management's behavior and to the stronger demand for higher quality earnings from outsiders. Therefore, Family allows us to further control for this relevant governance characteristic.

Finally, we calculate the percentage of independent directors sitting on the board, BIndependence, and the size of the board, BoardSize. Both of these characteristics have been associated with the effectiveness of shareholder monitoring. In particular, a higher level of board independence is related to higher levels of monitoring (Dechow, Sloan, & Hutton, 1996; Klein, 2002), and smaller and more compact boards are better monitors (Vafeas, 2000; Yermack, 1996). As a consequence, BIndependence and BoardSize have been associated, respectively, with a lower and higher extent of earnings management. Controlling for both of these factors allows for better tests of our hypotheses.

Model (2) of Table 7 presents results on our income-smoothing variable controlling for firm governance characteristics. We see that ChROA is negatively related to Capitalization ($P < 0.01$), indicating that the income-smoothing hypothesis still holds with the inclusion of firm-governance characteristics. Two of the governance variables (Largest-Owner, BoardSize) are not significant, indicating that in the Italian capital market system, these governance structures are not related to the decision of R&D cost capitalization. However, Family and BIndependence are weakly significant, indicating that these governance characteristics are related to the R&D capitalization decision. Finally, ROA is no more significant, which could indicate that controlling for governance structures, only the change in profitability is related to R&D cost capitalization. In sum, Model (2) of Table 7 indicates that governance variables play a marginal role in the capitalization decision; however, the profitability results are not affected.

We also conduct several additional tests (results unreported), in which we control for: bank ownership in firms (as a proxy for monitoring); whether the CEO is also the chair of the board (as a further indicator of board independence); and the percentage of independent directors on audit committees (as a measure of audit quality). These variables are not significant and their inclusion does not change our primary findings.

In the last robustness test (Model (3), Table 7), we extend our sample over multiple years in order to show that our results are not year- and sample-specific. Given that R&D-related

¹⁴ In order to distinguish family-controlled or -influenced companies from the others, we use the classification proposed by Corbelli and Minichilli (2005).

disclosures are difficult to find prior to 2001, we are not able to extend our hand-collection in order to obtain a larger sample size and to conduct more powerful statistical tests. In order to sidestep this problem, we use data available through Datastream. Unfortunately, Datastream reports R&D and advertising capitalized costs as one data item and does not report total R&D investments and amortization expenses related to the capitalized costs. Nevertheless, we calculate Capitalization-2 as an approximation of our original dependent variable based on the assumptions that follow. First, we consider all the capitalized costs to be related to R&D. We believe this to be a realistic assumption since, based on our hand-collected sample, we observe that capitalized advertising costs are rare in Italian companies due to the strong limits of such capitalization set forth by the Italian accounting standards. Second, we estimate the amortization of R&D costs by assuming a useful life of five years, which is the maximum time allowed by the Italian accounting standards and the most common policy among the companies in our hand-collected sample. Therefore, Capitalization-2 is calculated as capitalized costs minus estimated annual amortization divided by total assets.

We draw Datastream data from 1995 to 2004 for all the firms listed on the Milan Stock Exchange that belong to the same industries as those from our hand-collected sample (in order to reduce the risk of selecting companies not performing R&D activities). Our final sample contains 890 observations. In Model (3) of Table 7, we see that ChROA is still negatively related to our estimate of R&D cost capitalization ($P < 0.01$) and, similar to before, we do not find evidence for our leverage hypothesis. These findings confirm the robustness of the results obtained in the prior tables, strengthening our smoothing hypothesis by applying it to a larger sample and a longer period of time.

We perform additional tests on our original sample to control for other occurrences that might affect income smoothing by introducing two dummy variables (results unreported). We first test the big-bath hypothesis (see Huson, Wiedman, & Wier, 2003) where we control for changes in top management (whether the CEO or chair of the board changes during the year being observed); results remain unchanged. Then, we control whether the firm had an IPO in the year being observed or in the year prior to it. Results still remain unchanged.

Consequently, our findings indicate strong support for our income-smoothing hypothesis, given our results in Tables 6 and 7. This result is robust to alternate measures of change in profitability and to various covariates such as firm size, risk, growth opportunities, profitability, industrial membership and time controls, governance characteristics, and other extraordinary issues that could affect income smoothing (e.g., IPOs and executive turnover). Finally, we augment our results by an approximation method by which an estimated R&D capitalization variable is utilized in order to confirm our results over a longer period of time and on a larger dataset.

Throughout all of our analyses, we do not consider real-earnings management. As discussed before, earlier studies show that R&D costs are subject to real earnings-management policies (Dechow & Sloan, 1991; Perry & Grinaker, 1994; Bushee, 1998). This finding could partially affect our results and should be kept in mind when interpreting them. Our study shows that over and above real earnings-management strategies—companies use accounting flexibility to affect earnings through accruals. The existence of real-earnings management can weaken the relationship between the

capitalization of R&D costs and the variables related to earnings-management incentives, since some companies may prefer to reduce the R&D expenditures more than they do the related *expenses* through capitalization. Notwithstanding this effect, we find empirical support for our hypothesis and, from this, our conclusions are strengthened regarding the existence of accrual-earnings management as it relates to R&D costs.

7. Conclusions and limitations

This study examines the relationship between the choice of R&D cost accounting and earnings-management incentives. We hypothesize that the decision to capitalize R&D costs is related to a firm's change in profitability. Our results indicate that firms that have a lower return on assets (compared to the average of the previous two years) are more likely to capitalize R&D expenditures, while firms that have improved performance are more likely to expense, consistent with the earnings-smoothing hypothesis. We also hypothesize that a firm's level of debt financing is related to capitalizing decisions. We do not find support for this prediction – probably due to the fact that financial institutions tend to adjust reported earnings by eliminating the effect of any cost capitalization in order to limit the risk of misleading manipulation.

Our income-smoothing-related tests are robust to the introduction of a number of control variables and to a lengthening of the time period under analysis.

Our results have several policy implications. The convergence project recently started by IASB and FASB has raised a debate surrounding what constitutes an optimal accounting standard for R&D costs. Currently, the two bodies have different positions on this issue and the limited empirical research carried out thus far does not help in finding a common solution. This study contributes to this debate by providing empirical evidence on the use of R&D cost capitalization for purposes of earnings management. The results indicate that managers use R&D cost capitalization in order to smooth earnings. To the extent that earnings smoothing is considered an opportunistic strategy, our conclusions move in favor of the current FASB position, which does not allow for flexibility and requires all R&D costs to be expensed. On the other hand, we should not forget that earnings smoothing can also be an effective and efficient way to signal and communicate important information to the market and that prior literature generally supports R&D cost capitalization in terms of relevance for those who utilize financial statements. Therefore, whether the best accounting treatment for R&D costs is full expensing or capitalization (subject to some conditions) remains a controversial accounting issue that again leads us to the traditional relevance reliability trade-off.

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The moderating effects of hierarchy and control systems on the relationship between budgetary participation and performance[☆]

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Abstract

This study investigates the moderating effects that an organizational unit's hierarchical level and control systems have on the relationship between budgetary participation and performance. Using moderated regression analyses, we find a three-way interactive effect on performance between hierarchical levels, types of control systems, and budgetary participation. Further analyses reveal that at the high level of a hierarchy, budgetary participation has a positive relationship with performance and this relationship is stronger for organizational units that use output control than for those that use behavior control. By contrast, at the low level of a hierarchy, budgetary participation has a negative

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relationship with performance and this relationship is stronger for organizational units that use output control than for those that use behavior control.

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1. Introduction

Many scholars believe that the participative system of management and decision making is the ideal approach to governing organizations. They contend that this popular system enhances performance through increasing employee's input, level of commitment, and capacity to make choices and transform those choices into desired actions and outcomes (Ashmos, Duchon, McDaniel, & Huonker, 2002; Argyris, 1998; Kren, 1992; Brownell & McInnes, 1986; Collins, 1997). Jaques (1990) asserts that hierarchical organizations that rely on a complex system of highly prescribed rules, formalized control, and obedience to authority seem anachronistic and even dysfunctional in comparison to those that employ the participation system.

Researchers have found, however, that even when managers have embraced a rhetoric of participation, empowerment, and democracy, they have still been reluctant to share power, grant autonomy, disclose information, or include subordinates in substantive decision making (Cunningham & Hyman, 1999; Marsh, 1992). Furthermore, Argyris (1998) reports that subordinates have been reluctant to participate in decision making when it has led to greater task ambiguity and increased accountability for outcomes.

The question of whether budgetary participation has positive consequences such as increased motivation, greater commitment, more job satisfaction, and better performance has received tremendous attention in the accounting literature (e.g., Brownell, 1981; Brownell & McInnes, 1986; Brownell & Hirst, 1986; Chenhall & Brownell, 1988; Murray, 1990; Brownell & Dunk, 1991; Kren, 1992). Yet, studies aiming to answer this question have for the most part generated mixed results (Greenberg & Nouri, 1994; Murray, 1990). Kerr (2004) argues that the mixed results may be due in part to the assumption that as a method of governance and decision making, participation can be applied to all organizational settings. He asserts that this system is sometimes not feasible for an organization because lower level employees do not have the information, experience, understanding, and perspective to participate meaningfully in the decision-making process. Furthermore, participation might distract lower level employees' attention from maximizing efficiency and, given their typically limited access to information, they might not be able to fully understand the organization-wide implications of a particular decision (Simons, 2000). Kerr (2004) also suggests that participative decision making should be matched with types of control systems and levels of hierarchies in order to affect performance positively. He proposes that the relationship between participation and performance varies across types of control systems and that the two-way interaction between control systems and participation does not generalize across levels of hierarchies.

One limitation to past research is that many of the empirical studies on budgetary participation have focused their investigation on manufacturing companies in developed countries

such as the United States and Australia. Few studies, if any, have looked at its impact on performance in the public sectors and or in developing countries. Our study will address this gap in the research. Its purpose is to investigate the moderating effects of hierarchy and control systems on the relationship between budgetary participation and performance for governmental units in Indonesia.

The impact of budgetary participation on performance might be different in this setting for three reasons. First, most budgets in public sectors and or developing countries are prepared in response to political pressure rather than careful analyses (Uddin & Hopper, 2001). Political interventions in staff recruitments, budget preparations, and budget executions are very common in this environment (Hoque & Hopper, 1994). As such, the benefits of participation might not be fully realized.

Second, top management often treats employees unfairly due to the lack of recognition, protection of human rights and high unemployment rates. For instance, employees might be fired without the right to challenge the decision and to be compensated properly. As a result, employees might participate in the budgeting process not because they want to make meaningful contributions, but simply because of their fear of being punished (Uddin & Hopper, 2001).

Third, top management is often reluctant to share information with subordinates due to fear of manipulation and misinterpretation of information by their subordinates. Many senior managers are politicians and they like to maintain power distance with their subordinates (Alam, 1997). They often fear that budgetary participation may create opportunities for their subordinates to challenge their decisions, and, in turn, may jeopardize their reputation.

We hypothesize that level of hierarchy and control systems will moderate the relationship between budgetary participation and performance in such a way that organizational units that use output control and organization units that use behavior control will demonstrate a different relationship pattern at the high and low levels of a hierarchy. We argue that at the high level of a hierarchy, tasks tend to be more difficult and uncertain and budgetary participation will therefore have a positive relationship with performance. In contrast, at the low level of a hierarchy, tasks tend to be routine and budgetary participation will therefore have a negative relationship with performance. However, the positive (negative) relationship between budgetary participation and performance will be moderated by the types of control systems used.

Examining the moderating effects of hierarchical levels and control systems on the relationship between participation and performance is important because of the increased popularity of the participative approach as a system of management and decision making in organizations. In addition, Burton, Lauridsen and Obel (2002) argue that it is empirically important to investigate the impact of organizational structures, control systems, and decision-making styles that are mismatched because this mismatch may have negative performance implications and pose a challenge to managers.

This study contributes to the existing literature on budgetary participation in three ways. First, as has been stated, it attempts to fill a gap in the literature by conducting research in the public sector and in the developing nation of Indonesia. Second, it endeavors to provide a better understanding of the extant research in this area by investigating the moderating effects of hierarchical levels and control systems on the relationship between budgetary participation and performance. Third, it suggests that budgetary participation should not be

treated as a panacea for improving performance. Rather, this study indicates that budgetary participation should be matched with levels of hierarchies and types of control systems to positively affect performance.

The next section of this paper reviews the literature that has been used to develop our study's hypotheses and introduces these hypotheses. The second section describes the research method, and the third analyzes the data and presents the results. Finally, the concluding section discusses the study's major findings and limitations, as well as recommends a direction for future research.

2. Related literature and hypotheses

2.1. Budgetary participation and performance

There is a widely-held belief that budgetary participation benefits organizations by facilitating improved communication, more commitment, greater job satisfaction, and in turn, higher performance. However, the numerous empirical studies examining the effects of budgetary participation on various measures of outcome variables such as motivation, job involvement, and performance have yielded "extremely inconsistent results on the efficacy of participation" (Greenberg & Nouri, 1994, P. 117). Mia (1989) attributes the mixed results partly to inadequate recognition of the role that moderating variables play in impacting the relationship between budgetary participation and performance.

Shields and Young (1993) reach a similar conclusion. Based on their extensive review of studies investigating the effects of budgetary participation on performance, these authors report that "there were 24 tests of hypotheses in which the inferential statistic was significant ($p < 0.05$), 35 hypothesis tests in which the inferential statistic was not significant and or the sign was not as predicted (2)" (p. 266).

Brownell and McInnes (1986) investigate the relationship of budgetary participation to motivation and performance among middle-level managers in three manufacturing companies. They found that budgetary participation has a positive and significant effect on performance. Brownell (1981), Brownell and Dunk (1991), Kren (1990), and Dunk (1993) are among those other studies that report a positive and significant relationship between budgetary participation and performance. However, Brownell and Hirst (1986) were unable to corroborate this result and concluded that their findings' failure to support a positive relationship between budgetary participation and performance was perplexing. Brownell and Dunk (1991) subsequently conducted a follow-up study using data from manufacturing organizations in Sydney, Australia in order to re-examine the results reported by Brownell and Hirst (1986). This later study found that budgetary participation interacts with budgetary emphasis and task uncertainty to positively affect performance. Its results allowed the authors to conclude that budgetary participation has a positive impact on performance only when the level of task difficulty is high.

Other studies have reported that budgetary participation has a negative effect on various measures of performance such as role ambiguity (Chenhall & Brownell, 1988), job related tension (Kenis, 1979), slack (Onsi, 1973), and managerial performance (Mia, 1988). For example, Mia (1988) conducted a survey among the middle and lower level managers of a diversified company in Australia. This author reports that budgetary participation was found

to have a negative effect on the performance of managers who exhibited a less favorable attitude or lower degree of motivation. Conversely, it had a positive effect on the performance of managers with a more favorable attitude or higher degree of motivation. This author calls upon researchers to consider theoretically justified moderator variables when investigating the relationship between budgetary participation and performance, since this relationship may vary from one situation to another.

2.2. *Hierarchy, budgetary participation, and performance*

Jaques (1990) contends that work is organized in a hierarchical fashion not only because tasks have lower and higher degrees of complexity, but also because they reflect sharp discontinuities in complexity that separate them into a series of steps or categories; these discontinuities point to the need to employ different control systems for the work that is performed at different levels of the hierarchy. At the low level of a hierarchy, tasks tend to be repetitive and can be standardized. In the environments where such tasks are performed, efficiency is critical and participation might have a negative effect on performance. In contrast, tasks tend to be complex and unstructured at the high level of a hierarchy. In this case, participation will affect performance positively because it promotes an exchange of ideas and gives employees the discretion they require to modify tasks in response to changes in the environment.

Even though there are some drawbacks associated with organizational hierarchies, such as their capacity to squash initiative, crush creativity, slow down decision making, and decrease motivation, both research and practice reveal that managerial hierarchies are not only a very natural structure for large organizations to assume, but also highly efficient (Kerr, 2004; Jaques, 1990). Kerr (2004) argues that a properly-structured hierarchy can function to release energy and creativity, rationalize productivity, and actually improve morale. Furthermore, Jaques (1990) asserts that organizations need to understand how managerial hierarchies function and how to use them in order to deploy talent and energy more effectively.

Managerial hierarchies exist because the tasks to be performed and the capability required to complete these tasks are very different for high level managers as compared to low level managers (Ouchi, 1978). For example, tasks performed by top management are more difficult and uncertain than those encountered by managers on the shop floor. Top management must deal with not only a wide range of often unstructured and constantly changing data, but also with variables so tightly interlinked that they must be unraveled before they will yield useful information. In contrast, low level managers tend to perform tasks that are routine and predictable.

Researchers have argued that the effect of participation on performance varies systematically as a function of task difficulty (Brownell & Dunk, 1991), task uncertainty (Gresov, 1990; Brownell & Dunk, 1991) and information-processing capabilities (Scott, 1992; Jaques, 1990; Brownell & Dunk, 1991), for example, find that organizational units which deal with high task difficulty benefit more from the participative decision-making approach as compared to organizational units which deal with low task difficulty. They argue that when the tasks to be performed are repetitive and the goals are clear, management should formulate operating procedures and require little participation from their subordinates. In contrast, when the tasks to be performed are difficult and a considerable amount of thinking

is required to complete them, management should exchange ideas with their subordinates, give them opportunities to participate in the decision-making process, and allow them to exercise the discretion needed to modify tasks in response to situational demands.

Previous discussions are consistent with the view that participative budgeting is more beneficial when tasks are difficult because information asymmetry between superior and subordinate tends to be higher when tasks are more difficult.² This view is based on the assumption that subordinates know better about their task and task environment than their superior (Shields & Shields, 1998). Participative budgeting also enables superiors to learn about the interdependencies of various tasks performed by their subordinates enabling the superiors to coordinate the tasks better (Kanodia, 1993). Prior discussions indicate that budgetary participation helps superiors not only to plan and coordinate but also to execute the plan. Brownell and Hirst (1986), for example, argue that budgetary participation may provide opportunity for managers to introduce new and better means to address tasks. Budgetary participation also allows managers to incorporate the knowledge shared by subordinates in executing the budgets (Hopwood, 1976).

In summary, since organizational units at the high level of a hierarchy handle more difficult and loosely structured tasks, and managers at this level possess more capability to process unstructured and vast amounts of data, these units will benefit from participative decision making. In contrast, since organizational units at the low level of a hierarchy perform tasks that are repetitive and can rely on standardized operating procedures, the participation approach will cause inefficiency.³

2.3. Control system, budgetary participation, and performance

Ouchi (1978) describes the control mechanisms used by organizations as a process of monitoring, evaluating, and providing feedback. He argues that there are two types of organizational control: behavior control, which involves top-level managers observing their subordinates and counting the number of times that they engage in any particular behavior, and output control, which is less obtrusive and involves managers monitoring the after-effects of behavior as the outputs of the productive process. For instance, managers might monitor the activities performed by their subordinates during office hours (behavior control), or managers might ignore the activities and choose to monitor the number of completed reports produced by their employees (output control).

Ouchi (1978) points out that it is appropriate to use output control when the tasks to be performed are complex and unstructured. In an environment characterized by such tasks, the 'proper' behavior is not recognizable so observations of actual behavior are of no value for control purposes and behavior control cannot be used. By focusing instead on the concrete outcomes of behavior, superiors allow subordinates to have more leeway in terms of deciding how they perform their tasks. Consequently, the use of output control will have

² We are indebted to one of the anonymous reviewers of this journal for much of the content of this paragraph.

³ The prior literature has shown that other variables such as uncertainty, budget cutbacks, and environmental volatility might also interact with budgetary participation to affect performance. These variables, however, are relatively constant in our setting (i.e., Indonesian governmental units). Therefore, we did not include these variables in our study.

a positive impact on the relationship between participation and performance at the high level of a hierarchy.

Gowindarajan and Fisher (1990) propose that behavior control is appropriate when means–ends relations are well understood and the desirable behavior can be identified and is easy to observe (Ouchi & Maguire, 1975). Superiors can then control their subordinates by observing whether these workers' actual behavior conforms to what is seen as the desirable behavior. A formalized system is expedient in such an environment and gives managers a relatively free hand to focus an organization's resources on its preferred objectives (Simons, 2000). Therefore, we predict that the use of behavior control will have a negative impact on the relationship between budgetary participation and performance at the low level of a hierarchy.

A different stream of research (from the one adopted in this paper) on control systems focuses on investigating how managers use controls to help managers ensure that their organization's strategies and plans are carried out (e.g., Simons 1991, 1995, 2000; Bisbe & Otley, 2004). This stream of research classifies control systems as diagnostic control systems (which focus on monitoring and rewarding the achievement of a firm's key performance variables) and interactive control systems (which focus on constantly changing information that senior managers consider potentially strategic). Diagnostic control systems are usually described as information-feedback systems in which goals are set in advance, outcomes are compared with preset objectives, and significant variances are reported to managers for remedial action and follow-up (Anthony & Govindarajan, 2006). Diagnostic control systems are often called management by exception (Simons, 1991). In contrast, interactive control systems are driven by top management vision and are used on a day-to-day basis by top management to intervene in organizational decision making (Simons, 1991).

Since we are interested in the types of controls used and not the manner in which the controls were used, we believe that it is appropriate for our study to distinguish control systems in terms of output and behavioral control. The categorization of controls in terms of diagnostic and interactive might be more appropriate when researchers investigate the performance implications of control systems for firms pursuing different competitive strategies. For example, Simons (1995) argues that firms pursuing a strategy of cost efficiency will benefit more from diagnostic control systems due to this strategy's emphasis on standardized products and processes. In contrast, firms pursuing a strategy of innovation will benefit more from the use of interactive control systems due to the more dynamic competitive environment in which these firms operate. Although we did not classify the types of controls as interactive and diagnostic systems, the use of participative budgeting may indicate that managers use more interactive than diagnostic control systems.

2.4. Hierarchy, control system, and participation: a three-way interaction

Kerr (2004) proposes that organizations may benefit both from participation and formalized systems depending on their levels of hierarchy and the types of control systems they use. Budgetary participation may provide more advantages when it is used at the high level of a hierarchy, particularly if it is combined with an output control system. By contrast, the formalized decision-making approach may be more beneficial at the low level of a hierarchy when it is used in conjunction with a behavior control system (Ouchi, 1978).

Snell and Youndt (1995) propose that in a behavior control system, responsibilities are standardized and imposed top down with the primary concern being for procedures and methods. Accordingly, appraisals are based on superiors' observation of behavior, and employees are accountable for their actions regardless of the results (Liao, 2006). Snell (1992) suggests that behavior control is appropriate to be used when tasks are routine since superiors have sufficient knowledge of means ends relationships. Since tasks at the low level of a hierarchy tend to be routine, low level managers' performance will be more efficient and productive using standardized operating procedures (e.g., job description) in planning, investigating, coordinating, supervising, staffing, negotiating, and representing. For instance, standard operating procedures make the planning and supervising activities quicker and highly efficient due to their emphasis on ensuring that the procedures are carried out as specified (Khandwalla, 1973).

Kerr (1985) suggests that in an output control system, results are standardized and subordinates have discretion over the process they use to achieve the outcomes. Rather than standardizing behavior to maximize efficiency, output control focuses on goal accomplishment (Hofstede, 1978). Under this approach, superiors provide opportunities for subordinates to contribute in the decision-making processes (Michael, 1973). As such, this approach is appropriate to be used when tasks are complex and unstructured such as those performed by managers at the high level of hierarchies (Kerr, 1985). For example, the quality of plans will improve with inputs from subordinates who have better knowledge of the task environment. Similarly, the likelihood of achieving the goals will increase due to the ability of subordinates to make adjustments in response to the changing environment (Jaeger & Baliga, 1985).

Previous discussions indicate that the relationship between budgetary participation and performance varies across hierarchical levels and types of control systems. There is, therefore, a need to investigate the effect that the three-way interaction among hierarchical levels, control

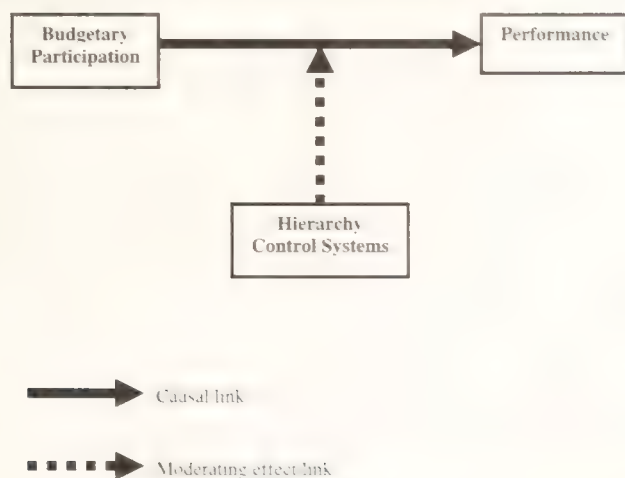


Fig. 1. Hierarchy and control systems as moderator variables of the relationship between budgetary participation and performance

systems, and budgetary participation has on performance. Fig. 1 shows the proposed relationship between these variables.

This figure indicates that hierarchical levels and types of control systems will moderate the relationship between budgetary participation and performance. Hence, the following hypothesis will be tested:

Hypothesis 1. Hierarchical levels, control systems, and budgetary participation will have a three-way interactive effect on performance.

We use the following moderated regression model to test Hypothesis 1⁴:

$$\begin{aligned} \text{Perform}_i = & \gamma_0 + \gamma_1 \text{Hierarchy}_i + \gamma_2 \text{Control}_i + \gamma_3 \text{Participation}_i \\ & + \gamma_4 \text{Control}_i * \text{Hierarchy}_i + \gamma_5 \text{Control}_i * \text{Participation}_i \\ & + \gamma_6 \text{Hierarchy}_i * \text{Participation}_i \\ & + \gamma_7 \text{Control}_i * \text{Hierarchy}_i * \text{Participation}_i + \varepsilon_i \end{aligned} \quad (1)$$

Where,

Perform_i = performance of organizational unit i .

Hierarchy_i = levels of a hierarchy. An indicator equal to one for organizational units at the high level of a hierarchy and zero otherwise.

Control_i = types of control systems used. An indicator equal to one for organizational units that use output control and zero otherwise.

Participation_i = level of participation in decision making.

Hypothesis 1 will be confirmed if the estimated coefficient on $\text{Control} * \text{Hierarchy} * \text{Participation}$ is significant.

Previous discussions also suggest that at the high level of a hierarchy, budgetary participation will have a positive effect on performance and the use of output control (behavioral control) will enhance (mitigate) the positive effect. As Kerr (1985) points out, output control tends to focus on goal accomplishment and subordinates have discretion over the process to influence the outcome. In contrast, behavior control tends to focus on procedures and methods in which responsibilities are standardized and imposed top down (Snell & Youndt, 1995). On the one hand, when subordinates are allowed to participate in the decision-making process and the control system encourages subordinates to have discretion when performing their tasks (i.e., output control), the positive effects of participation on performance is likely to be stronger. On the other hand, when subordinates are allowed to participate in the decision-making process but the control system focuses on standardized procedures to promote efficiency (i.e., behavior control), the positive effects of participation on performance is likely to be weaker. Hence, the following hypothesis will be tested:

Hypothesis 2. At the high level of a hierarchy, budgetary participation will have a positive relationship with performance and the relationship will be more positive for organizational units that use output control than for those that use behavior control.

⁴ Cohen and Cohen (2003) suggest that in a three-way interaction model, all lower-order terms must be included in the model to prevent from drawing conclusions of the existence of a three-way interaction when, in fact, the effect is due to lower-order effects.

In contrast, at the low level of a hierarchy, budgetary participation will have a negative effect on performance and the use of behavioral control (output control) will mitigate (exacerbate) the negative effect. As discussed earlier, at the low level of a hierarchy, tasks tend to be routine and can be standardized to promote efficiency. In such an environment, participation is likely to be counterproductive (Jaques, 1990). The negative effect of participation on performance, however, will be influenced by the types of control systems used. On the one hand, when the control system focuses on standardized operating procedures (i.e., behavior control), low level managers' performance on routine tasks is likely to improve. Therefore, we expect that for organizational units in the low level of a hierarchy that use behavior control, the negative impact of participation on performance will be weaker. On the other hand, when the control system allows subordinates to have discretion over the process to influence the outcomes (i.e., output control), low level managers' performance on routine tasks is likely to be less efficient. Therefore, we predict that for organizational units in the low level of a hierarchy that use output control, the negative impact of participation on performance will be stronger. Hence, the following hypothesis will be tested:

Hypothesis 3. At the low level of a hierarchy, budgetary participation will have a negative relationship with performance and the relationship will be more negative for organizational units that use output control than for those that use behavior control.

To test the pattern of relationship (Hypotheses 2 and 3), we rearrange Eq. (1) to show the regression of budgetary participation on performance using different types of control systems and at different levels of hierarchies, as suggested by Aiken and West (1991). This method yields the following simple-slope expression:

$$\text{Perform}_i = (\gamma_3 + \gamma_5 \text{Control}_i + \gamma_6 \text{Hierarchy}_i + \gamma_7 \text{Control}_i * \text{Hierarchy}_i) \text{Participation}_i + (\gamma_0 + \gamma_1 \text{Hierarchy}_i + \gamma_2 \text{Control}_i + \gamma_4 \text{Control}_i * \text{Hierarchy}_i) + \varepsilon_i \quad (2)$$

Since hierarchy and control are binary variables, Eq. (2) can be rewritten to show the impact of budgetary participation on performance at the different levels of a hierarchy that use different types of control systems:

For the high level of a hierarchy, Eq. (2) can be rewritten as follows:

$$\text{Perform}_i = \begin{cases} (\gamma_3 + \gamma_5 + \gamma_6 + \gamma_7) \text{Participation}_i + \gamma_0 + \gamma_1 + \gamma_2 + \gamma_4 + \varepsilon_i & \text{For the high level of a hierarchy (Hierarchy = 1) that uses output control (Control = 1). (a)} \\ (\gamma_3 + \gamma_6) \text{Participation}_i + \gamma_0 + \gamma_1 + \varepsilon_i & \text{For the high level of a hierarchy (Hierarchy = 1) that uses behavior control (Control = 0). (b)} \end{cases} \quad (3)$$

For the low level of a hierarchy, Eq. (2) can be rewritten as follows:

$$\text{Perform}_i = \begin{cases} (\gamma_3 + \gamma_5) \text{Participation}_i + \gamma_0 + \gamma_1 + \varepsilon_i & \text{For low level of a hierarchy (Hierarchy = 0) that uses output control (Control = 1). (a)} \\ \gamma_3 \text{Participation}_i + \gamma_0 + \varepsilon_i & \text{For low level of a hierarchy (Hierarchy = 0) that uses behavior control (Control = 0). (b)} \end{cases} \quad (4)$$

The predicted pattern of relationship between participation and performance using different types of control systems and at different levels of hierarchies will be confirmed if the regression line of Eq. (3a) is significantly more positive than the regression line of Eq. (3b) and the regression line of Eq. (4a) is significantly more negative than the regression line of Eq. (4b).

3. Research method

3.1. Sample

Government offices in three main Indonesian cities were selected. A survey questionnaire was administered to a sample of government employees in the upper level of the hierarchy (department heads) and the lower level of the hierarchy (section heads).⁵ The need to obtain access to these individuals as well as time and funding constraints prevented us from using a random sampling technique. However, given that all government units tend to be organized in a relatively similar fashion, there is no reason to suspect any systematic bias in the findings of this study.

Government organizations provide an appropriate setting for studying the impact of hierarchical levels, control systems, and budgetary participation on performance. These organizations are characterized by a hierarchical and bureaucratic structure, strict regulations, established routines, and formal procedures. Lines of communication are embodied in organizational charts and official ranks of authority are reflected in job descriptions (Breton, 1995). All these characteristics play a dominant role in structuring the work of employees, and subordinates must thoroughly understand their limits in terms of exercising discretion before they can engage in budgetary participation confidently and creatively within those boundaries (Gresov, 1989).

In our study, for example, the tasks performed by the department heads include developing long-term plans, formulating policies and procedures, coordinating interorganization activities, developing performance-evaluation criteria and procedures, and evaluating the performance of section heads. These tasks tend to be difficult and unstructured requiring more thinking and exchange of ideas to complete the tasks (Van de Ven, Delbecq & Kownig, 1976). In contrast, the tasks performed by the section heads are more routine include preparing daily/monthly reports, monitoring employees' attendance, maintaining departments' logistics, providing technical support, monitoring the implementation of policies and procedures, disseminating information, evaluating lower level employees' performance, and coordinating intraorganization activities. These routine tasks can be completed well using standardized procedures (Drazin & Van de Ven, 1985). Furthermore, department heads have to manage

Two pilot studies were conducted prior to administering the questionnaires to the respondents. The first study used ten respondents (university colleagues) to investigate the degree of understanding of the questionnaires. As a result, some clarifications and simplifications were made to the original questionnaires. The second study used five respondents: two department heads and three section heads from different government units from the units used in this study, to obtain preliminary results related to the hypotheses developed in this study and to investigate any necessary changes before the final survey was conducted. The two pilot studies and the actual survey used questionnaires that were written in the Indonesian language.

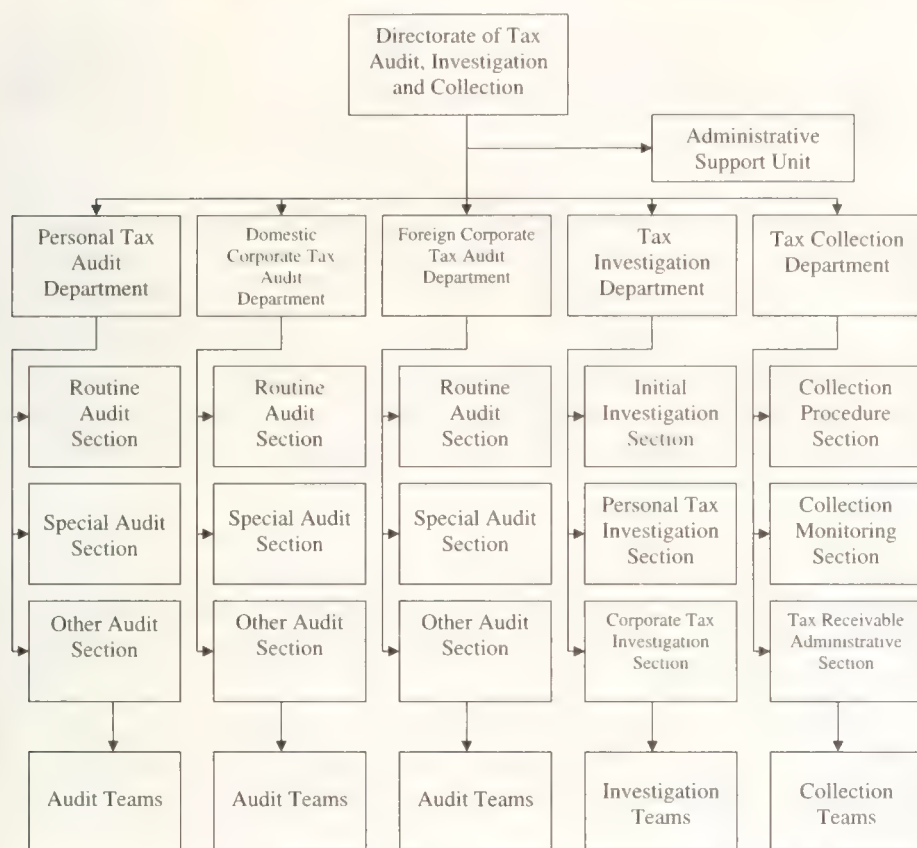


Fig. 2. Organizational structure of directorate of tax audit, investigation and collection.

larger number of employees as compared to section heads. Fig. 2 shows the organizational structure of one of the government units in our study. As shown in Fig. 2, the directorate of tax audit, investigation, and collection has five departments. Each department has three sections. Each section usually has three to four teams consisting of four to five members in each team. Therefore, a department head has to manage about 36 to 60 employees while a section head has to manage about 12 to 20 employees.

We contacted the top management personnel of the organizational units we selected in order to obtain their commitment to participate in this study. We also asked them to nominate survey coordinators who would be responsible to distribute and collect the questionnaires and to provide a list of department heads and section heads. Respondents who were selected from this list delivered their completed questionnaires to the survey coordinators over a predetermined two-week period. We distributed 463 questionnaires, giving 92 of them to department heads and the remaining 371 to section heads. Two hundreds and four valid responses were obtained from the 463 questionnaires distributed (a response rate of 44%). These valid responses came from 43 department heads (a response rate of 47%) and 161 section heads (a response rate of 43%).

3.2. Variable measurement

Appendix A contains an abbreviated version of the questionnaire used to measure the variables in this study.

3.2.1. Performance

The measurement of performance was based on an instrument first developed by Mahoney, Jerdee, and Carroll (1965) and later used in previous studies such as Kren (1992), Frucot and Shearon (1991), and Brownell and Hirst (1986). The performance indicator consists of nine items. We asked respondents to rate their achievement on a seven-point Likert-type scale (1 = significantly below average; and 7 = significantly above average) in regard to: planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, and representing. We then assessed the overall achievement scores and responses to the nine items were combined into one construct to represent the organizational unit's performance.

3.2.2. Budgetary participation

The level of budgetary participation was measured by asking respondents about their degree of influence on the decisions that could affect the performance of their units. The instrument we used to measure budgetary participation is based on the scale for participatory decision making developed by Vroom and Mann (1960).⁶ This instrument has four items and responses were given on a seven-point Likert-type scale (1 = strongly disagree; and 7 = strongly agree). An overall measure of participation in decision making was obtained by summing up responses to the four individual items divided by four. Therefore, the highest possible score is seven and the lowest possible score is one.

3.2.3. Types of control systems

The measurement of types of control systems was based on the eight items developed by Ouchi and Maguire (1975). We asked respondents to indicate the relative usage of output control and behavior control on a seven-point Likert-type scale (1 = strongly disagree; and 7 = strongly agree). Responses to the eight items were combined into a single item in which low scores represented behavior control and high scores represented output control.⁷ We then used a mean-split approach to dichotomize the item into behavior control and output control. Units that scored greater than the mean of the eight items were classified as using output control, while those that scored lower than the mean were classified as using behavioral control. To validate whether our approach to combine output and behavior controls into a single continuum is appropriate, we sum the scores of the behavior control

⁶ Since we are interested in investigating the degree of influence (not the frequency of participation) the respondents have on the decisions that could affect respondents' performance, we adapt the participatory decision making measure of Vroom and Mann (1960) in favor of Milani's (1975) scale for budgetary participation (see our discussions in Abdel Halim (1988) related to the difference between the degree of influence and the frequency of influence that subordinates have on the decision making process).

⁷ This scale coding was performed to questions two, three, and six to ensure that low scores represent behavior control and high scores represent output control.

Table 1
Descriptive statistics of performance, participation, level of hierarchy and types of control systems^a

Variables	Mean	Standard deviation	Median	Minimum	Maximum	Skewness ^b	Cronbach's alpha
Performance	6.135	0.907	6.333	2.000	7.000	−2.610	0.95
Participation	2.078	1.669	2.000	1.000	7.000	0.319	0.92
Hierarchy	0.210	0.409	0.000	0.000	1.000	N/A ^c	N/A
Control systems	0.392	0.489	0.000	0.000	1.000	N/A	0.98
Control*Hierarchy	0.113	0.317	0.000	0.000	1.000	N/A	
Control*Participation	1.794	2.250	0.000	0.000	7.000	N/A	
Hierarchy*Participation	1.174	2.287	0.000	0.000	7.000	N/A	
Control*Hierarchy*Participation	0.626	1.765	0.000	0.000	7.000	N/A	

^a Performance is the organization unit's performance. Control is the type of control used (an indicator equal to one for output control and zero otherwise). Hierarchy is the level of hierarchy (an indicator equal to one for high level of hierarchy and zero otherwise). Participation is the level of budgetary participation. Control*Hierarchy is the interaction term between control system and hierarchy. Control*Participation is the interaction term between control and budgetary participation. Hierarchy*Participation is the interaction term between hierarchy and budgetary participation. Control*Hierarchy*Participation is the three-way interaction between Control system, hierarchy, and budgetary participation.

^b We tested for normality of the data using the Kolmogorov–Smirnov test. The results of these procedures indicate that only the performance variable violates the normality assumption ($Z = 3.495, p = 0.01$). Consequently, we transformed the performance variable using a logarithmic function when conducting the statistical analyses.

^c Since hierarchy and control systems are dummy variables, the measure of skewness is not appropriate for these variables and the interaction terms with these variables.

items and the output control items and then correlate these two sums. The Pearson correlation between the two sums is negative and statistically significant ($r = -0.952, p < 0.001$). The negative and significant correlation between the two sums confirms that the control system is a homogeneous construct.

3.2.4. Level of hierarchy

The level of hierarchy is a dummy variable based on the structural position of the respondent.⁸ We coded one for the high level of a hierarchy (department heads) and zero for the low level of a hierarchy (section heads).

4. Data analysis and results

4.1. Descriptive statistics and correlations

Table 1 presents the descriptive statistics for the variables used in this study. The average performance of the organizational units is 6.14 with a minimum of 2.00 and a maximum of 7.00. The reliability coefficient computed for this construct is 0.95. For budgetary participation, the average score is 2.08 with a minimum of 1.00 and a maximum of 7.00; the reliability coefficient computed for this construct is 0.92. Twenty-one percent of our

⁸ Although most previous studies investigating the effect of budgetary participation on performance focus their investigation on the relationship between managers at the upper level of a hierarchy and shop floor employees, some studies have investigated this relationship at different levels of hierarchies (e.g., Ouchi & Maguire, 1975; Ouchi, 1978).

Table 2
Pearson's correlations among variables ($n = 204$) (p -values in parenthesis)

Variable	Performance	Participation	Hierarchy	Control	Control * Participation	Control * Hierarchy	Hierarchy * Participation	Control * Hierarchy * Participation
Performance	1							
Participation	0.193 (0.000)	1						
Hierarchy	0.074 (0.130)	0.078 (0.115)	1					
Control	0.084 (0.118)	0.094 (0.111)	0.151 (0.031)	1				
Control * Participation	0.141 (0.044)	0.151 (0.000)	0.192 (0.002)	-0.048 (0.495)	1			
Control * Hierarchy	0.088 (0.209)	0.098 (0.204)	0.490 (0.000)	0.444 (0.000)	0.226 (0.000)	1		
Hierarchy * Participation	0.194 (0.006)	0.216 (0.000)	0.299 (0.000)	0.149 (0.033)	0.194 (0.000)	0.086 (0.000)	1	
Control * Hierarchy * Participation	0.196 (0.005)	0.294 (0.000)	0.388 (0.000)	0.433 (0.000)	0.236 (0.000)	0.298 (0.000)	0.387 (0.000)	1

Performance is measured as the logarithmic function of the organization unit's performance. Control is the types of control used (an indicator equal to one for output control and zero otherwise). Hierarchy is the level of hierarchy (an indicator equal to one for high level of hierarchy and zero otherwise). Participation is the level of budgetary participation centered toward the mean. Control * Hierarchy is the interaction term between control systems and hierarchy. Control * Participation is the interaction term between control and budgetary participation. Hierarchy * Participation is the interaction term between hierarchy and budgetary participation. Control * Hierarchy * Participation is the three-way interaction between control system, hierarchy, and budgetary participation.

respondents are department heads (high level of a hierarchy) and 79% are section heads (low level of a hierarchy). In terms of control systems, 39% of our respondents use output control and 69% use behavior control. The reliability coefficient for this construct is 0.98.

Table 2 reports the Pearson correlations between the variables used in this study. The results indicate that budgetary participation negatively affects performance ($r=-0.193$, $p<0.01$). However, the positive and significant correlation between level of a hierarchy and control systems suggests that organizational units at the high level of a hierarchy use more output control than organizational units at the low level of a hierarchy ($r=0.151$, $p<0.05$). The correlation between hierarchy*participation and performance is positive and significant ($r=0.194$, $p<0.01$). Furthermore, the correlation between control*hierarchy*participation and performance is also positive and significant ($r=0.196$, $p<0.01$). The positive and significant relationship between hierarchy*participation and performance, and control*hierarchy*participation and performance provide early support for the hypotheses developed for this study.

4.2. Hypotheses testing

We begin our analyses by performing a simple linear transformation of the participation scores that render zero on the participation score meaningful. Following the approach suggested by Cohen, Cohen, West, and Aiken (2003), we center participation by subtracting the mean score of participation from each observed participation score. Without this transformation, the interpretation of the lower-order coefficients in the moderated regression analysis will be problematic since the regression coefficient of one independent variable

Table 3
Regression results of performance on hierarchy, control systems, and budgetary participation using dichotomous and continuous measures of control systems

Variables	Prediction	Dichotomous control		Continuous control	
		Coefficient	p-values	Coefficient	p-values
Intercept		0.801	0.000	0.930	0.000
Participation	?	-0.146	0.036	-0.016	0.127
Hierarchy	?	0.206	0.002	0.160	0.008
Control	?	-0.051	0.000	-0.034	0.006
Control*Hierarchy	+	0.292	0.000	0.049	0.017
Control*Participation	-	-0.172	0.012	-0.006	0.158
Hierarchy*Participation	+	0.215	0.001	0.019	0.004
Control*Hierarchy*Participation	+	0.658	0.000	0.114	0.018
Adjusted R ²		0.285		0.391	
F-statistics		17.819	0.000	22.296	0.000
Sample size		204		204	

Performance is measured as the logarithmic function of the organization unit's performance. Control is the type of control used (an indicator equal to one for output control and zero otherwise). Hierarchy is the level of hierarchy (an indicator equal to one for high level of hierarchy and zero otherwise). Participation is the level of budgetary participation centered toward the mean. Control*Hierarchy is the interaction term between control systems and hierarchy. Control*Participation is the interaction term between control and budgetary participation. Hierarchy*Participation is the interaction term between hierarchy and budgetary participation. Control*Hierarchy*Participation is the three-way interaction between control system, hierarchy, and budgetary participation.

represents the regression of the dependent variable on the independent variable when the other independent variables are zero (Jaccard et al., 1990). Hartmann and Moers (1999) acknowledge that the lower-order effects in a moderated regression analysis cannot be easily interpreted. However, they argue that this does not imply that the coefficients of the lower-order effects in an interaction model are lacking all meaning because they signify the main effect of the variable when the value of the other variable(s) is zero. Since the variables used in this study are measured using interval scales, the scale origins and thus the linear transformations of variable scores are arbitrary, and have no substantive meaning. Jaccard, Turrissi, and Wan (1990) assert, however, that if the variables are centered on their respective means, the zero values obtain a specific meaning. Furthermore, we also transform the performance variable using a logarithmic function since this variable violates the normality assumption (Skewness = 2.610, Kolmogorov–Smirnov $Z = 3.495$, $p < 0.01$). The result of the log transformation is that the negatively skewed performance variable is transformed into a more symmetrical data distribution (Fox, 1997).

Table 3 reports the results of the moderated regression analyses of the effect that hierarchy, participation, and control systems had on performance using dichotomous and continuous measures of control systems.⁹ Since the results are, in general, consistent across both specifications, we will discuss only the results based on the dichotomous measure of control systems.¹⁰

The F -statistics for the regression is significant ($F = 17.819$, $p < 0.001$, Adjusted $R^2 = 0.285$). Hypothesis 1 predicts that hierarchical levels, control systems, and budgetary participation will have an interactive effect on performance. This three-way interaction hypothesis was tested with the estimated coefficient on Control * Hierarchy * Participation. The significant coefficient on Control * Hierarchy * Participation ($\beta = 0.658$, $p < 0.001$) confirms the hypothesis that hierarchy and control systems moderate the relationship between budgetary participation and performance.

To examine whether budgetary participation has a positive relationship with performance at the high level of a hierarchy, and whether the relationship is more positive for organizational units that use output control than for those that use behavior control, we compare the regression line based on Eq. (3a) and (3b). Specifically, we compare between the simple slopes for the high level of a hierarchy that uses output control (Participation + Hierarchy * Participation + Control * Participation + Control * Hierarchy * Participation) and the high level of a hierarchy that uses behavior control (Participation + Hierarchy * Participation). As predicted, the results indicate that the sum of the coefficients on Participation and Hierarchy * Participation is positive although not significantly different from zero ($-0.146 + 0.215 = 0.069$; $t = 1.094$, $p = .275$). The sum of the coefficients on Participation, Hierarchy * Participation,

⁹ To assess the linearity of the participation-performance relations, we performed the Lincheck procedure via Regress command in STATA. The results indicate that the pattern of relationship between participation and performance is consistent across the four quartiles, suggesting that the participation-performance relations are linear.

¹⁰ The control systems are dichotomized because this categorization has substantial advantages over the use of a continuous variable for the understandability of the regression outcomes and the statistical power of the moderated regression analysis (Arnold, 1984). Although dichotomization results in a loss of explanatory power, Jaccard and Moers (1999) suggest that these advantages are especially important for analyses that incorporate higher than two-way interactions.

Control*Participation, and Control*Hierarchy*Participation is more positive and significantly different from zero ($-0.146+0.215-0.172+0.658=0.555$; $t=4.124$, $p<0.001$).

To examine whether the correlation for the high level of a hierarchy that uses output control is statistically different from the correlation for the high level of a hierarchy that uses behavior control, we conducted a z -test proposed by Chen and Popovich (2002).¹¹ We obtained a z -score of 1.69, which is greater than the critical value of 1.64 for an α -level of 0.10 but smaller than the critical value of 1.96 for an α -level of 0.05.¹² This result indicates that the correlation between budgetary participation and performance for organizational units at the high level of a hierarchy that use output control is significantly more positive than for those at the high level of a hierarchy that use behavior control. These results are consistent with Hypothesis 2.

To test whether the relationship between budgetary participation and performance at the low level of a hierarchy is more negative for organizational units that use output control than for those that use behavior control, we compare the regression line based on Eqs. (4a) and (4b). Specifically, we compare the simple slope for the low level of a hierarchy that uses behavior control (Participation) and the simple slope for the low level of a hierarchy that uses output control (Participation+Control*Participation). As predicted, the results indicate that the coefficient on Participation is negative and significantly different from zero (-0.146 ; $t=-2.101$, $p=0.036$). The sum of the coefficients on Participation and Control*Participation is more negative and significantly different from zero ($-0.146+(-0.172)=-0.318$; $t=-3.432$, $p<0.001$).

To examine whether the correlation between budgetary participation and performance for organizational units at the low level of a hierarchy that use output control is statistically different from the correlation for those at the low level of a hierarchy that use behavior control, we conduct a z -test proposed by Chen and Popovich (2002), as described above. We obtain a z -score of 6.408, which is greater than the critical value of 2.58 for an α -level of 0.01.¹³ This result indicates that the correlation between participation and performance for organizational units at the low level of a hierarchy that use output control is significantly more negative than the correlation for those at the low level of a hierarchy that use behavior control.¹⁴ The results are consistent with Hypothesis 3.

The moderating effects of hierarchical levels and control systems on the relationship between budgetary participation and performance can be better understood by using graphical terms. Cohen et al. (2003) suggest that a three-way interaction model can be broken down into a more interpretable form by considering the interaction of two of

¹¹ Chen and Popovich (2002) propose that to examine whether the correlation in subgroup A differs from that in subgroup B, a z -test can be performed using the following formula: $z = \frac{Z_{A_{\text{cor}}} - Z_{B_{\text{cor}}}}{\sqrt{\frac{1}{n_A} + \frac{1}{n_B}}}$, where both $Z_{A_{\text{cor}}}$ and $Z_{B_{\text{cor}}}$ are the Fisher's Z -values for subgroup A and subgroup B, respectively, and n_A and n_B are sample sizes of subgroup A and subgroup B, respectively.

¹² Alternatively, we test whether $(\gamma_A + \gamma_S + \gamma_n + \gamma_c)$ is greater than $(\gamma_A + \gamma_n)$. The results are qualitatively similar to those based on the procedures proposed by Chen and Popovich.

¹³ See footnote 12.

¹⁴ We performed subgroup analyses to assess whether the slopes in the regression of performance on participation for the high-level managers and the low-level managers are significantly different from zero when behavior control is used. The results indicate that for the high-level managers, the slope is not significantly different from zero ($t=1.42$, $p=1.63$), and for the low-level managers, the slope is only marginally significantly different from zero ($t=-1.71$; $p<0.10$). The results indicate that the impact of budgetary participation on performance is only marginal (insignificant at the high-level of a hierarchy) when there is little output-based control.

the variables at different values of the third variable. To plot the three-way interaction as a two-way interaction (Control*Participation) at different hierarchical levels, we use Eqs. (3)–(4). The results are shown in Fig. 3.

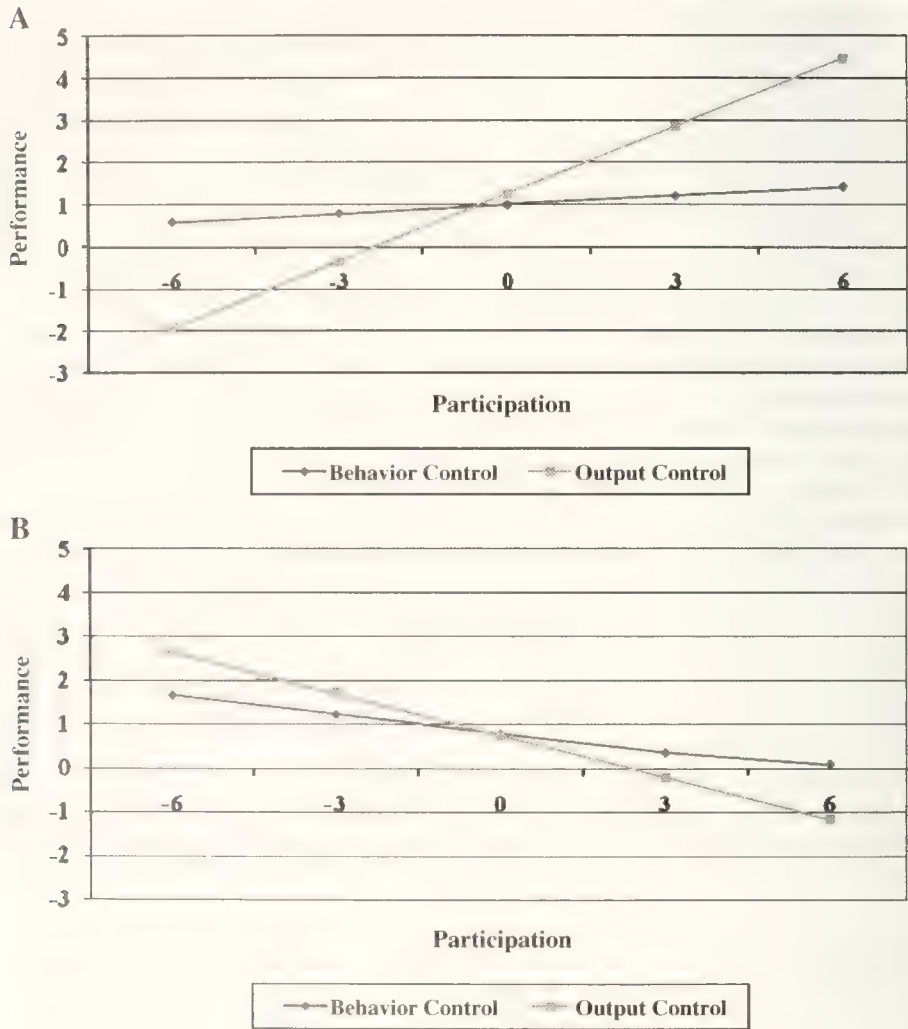


Fig. 3. The moderating effects of hierarchy and control systems on the relationship between budgetary participation and performance. Panel A: High level of hierarchy^a. ^bAt the high level of hierarchy, the performance values for organizational units that use output control are the sum of the estimated coefficients for the intercept, Hierarchy, Control, Participation, Hierarchy*Participation, Control*Hierarchy, Control*Participation, and Control*Hierarchy*Participation. The performance values for organizational units that use behavior control are the sum of the estimated coefficients for the intercept, Hierarchy, Participation, and Hierarchy*Participation. Panel B: Low Level of hierarchy^a. ^cAt the low level of hierarchy, the performance values for organizational units that use output control are the sum of the estimated coefficients for the intercept, Control, Participation, and Control*Participation. The performance values for organizational units that use behavior control are the sum of the estimated coefficients for the intercept and Participation.

Table 4
Results of factor analyses on budgetary participation, control systems, and performance

Factor	Eigenvalue	Percent of variance explained	Cumulative percentage
Participation	3.29	82.25	82.25
Control systems	5.27	65.89	
	1.691	21.14	87.03
Performance	6.73	89.72	89.72

The factors were generated using factor analysis with varimax rotation. Factors with Eigenvalues greater than 1.00 were retained.

Fig. 3 depicts the predicted values of performance for organizational units at the high (panel A) and low (panel B) levels of a hierarchy as a function of control systems and budgetary participation; these values are based on the regression estimates reported in Table 3. The pattern of relationship between budgetary participation and performance as a function of control systems differs depending on hierarchical level, indicating the presence of a three-way interaction between hierarchy, control systems, and budgetary participation. For organizational units at the high level of a hierarchy, budgetary participation has a positive effect on performance. The strength of the positive relationship between budgetary participation and performance depends upon the type of control system used; the former has a stronger effect on the latter for organizational units that use output control as compared to those that use behavior control.

In contrast, for organizational units at the low level of a hierarchy, budgetary participation has a negative effect on performance. The strength of the negative relationship again depends on the type of control system used. Although budgetary participation affects performance negatively, organizational units that use output control show a more negative effect as compared to those that use behavior control.

4.3. Robustness checks

In this section we discuss the results of a robustness check pertaining to the development of the constructs used in this study. We use factor analysis to investigate the research questions related to budgetary participation, types of control, and performance.¹⁵

As shown in Table 4, participation has one factor (82% of the variance explained), types of control systems have two factors (87% of the variance explained),¹⁶ and performance has one factor (75% of the variance explained). These results confirm that the multi-item questionnaires have dimensions that are consistent with the proposed constructs used in this study.

¹⁵ We use principal components factor analysis with Varimax rotation. In applying this procedure, factors with Eigenvalues greater than 1.00 were retained.

¹⁶ To obtain a clear pattern of loadings, we use Varimax with Kaiser Normalization rotation method. The results indicate that the first factor is marked by high loadings on the behavior-control items and the second factor is marked by high loadings on the output-control items. The results confirm that the control system, as measured by the questionnaire, is composed of two aspects: behavior and output-control systems.

5. Discussion, limitations and direction for future research

Argyris (1998) asserts that while managers love the participation model in theory, the command-and-control model is what they trust and know best. He further claims that organizations have found implementing the participative approach frustrating because they have assumed that it can be applied to all organizational settings. More research is therefore needed to clarify which types of organizational settings best suit the participative approach. Towards this end, Mia (1988) suggests that researchers need to consider theoretically justified moderating variables when investigating the effects of budgetary participation on performance in order to gain a better understanding of the relationship between these two variables.

Overall, the results are consistent with the three-way interaction hypothesis that the level of a hierarchy and the type of control system moderate the relationship between budgetary participation and performance. On the one hand, the results indicate that budgetary participation has a positive relationship with performance at the high level of a hierarchy; this relationship is more positive for organizational units that use output control than for those that use behavior control. On the other hand, budgetary participation has a negative relationship with performance at the low level of a hierarchy and is more negative for organizational units that use output control than for those that use behavior control.

The positive relationship between budgetary participation and performance at the high level of a hierarchy is consistent with the relationship reported by Brownell and McInnes (1986). These authors found that budgetary participation has a positive impact on performance only when task difficulty is high (i.e., managers at the high level of a hierarchy handle more complex tasks than those at the low level of a hierarchy). Their results reinforce the need to consider theoretically justified moderating variables when investigating the effect of budgetary participation on performance.

The results of this study, however, should be interpreted in light of three limitations. First, while data collected from survey questionnaires enables researchers to explore rich data that are based in reality by obtaining information that is not publicly available, it must be acknowledged that responses to the questionnaires are subjective and could be biased by respondents' inclination to give socially desirable responses. Kren (1992) recognizes that the use of self-rated performance scores has the potential for bias in terms of higher mean values when compared to the use of objective performance measures. However, he argues that this bias may not be consequential since there is no reason to suspect a systematic relationship with the independent variable.

Second, the results of this study might have been influenced by both public sector characteristics and Indonesian national culture. Previous studies investigating the relationship between budgetary participation and performance were conducted mostly on private sector manufacturing companies in the United States and Australia, whereas this study was conducted using a survey of governmental units in Indonesia. Governmental units are hierarchical, bureaucratic and structured according to a formal system of authority (Breton, 1995). As such, they are characterized by strict regulations, established routines, and formal procedures for performing tasks (Gresov, 1989). Furthermore, Hofstede (1991) find that Indonesian culture is characterized by less individualism, power distance, uncertainty avoidance, and masculinity than western cultures such as those of the United States and

Australia. However, a more recent study by Heuer, Cummings, and Hutabarat (1999) find that the differences in the cultural dimensions of Indonesian and American managers were significantly narrower than was indicated by Hofstede's 1991 findings. This finding suggests that our results might reflect more contemporary Indonesian cultural values and hence be comparable to those of previous studies conducted in the United States and Australia. Nevertheless, future research might extend our study by using data from public sectors in other developing countries.

Finally, this study only investigates the moderating effects of hierarchical levels and control systems on the relationship between participation and performance. Other variables such as technology may also exert a significant effect on the relationship between participation and performance, and merit further investigation.

Appendix A. Abbreviated research questionnaire

A.1. Budgetary participation

Please indicate the typical influence you have in affecting the outcome of each decision that could affect your organizational unit's performance:

- Q1: I participate in setting the budgets for my organizational unit (1 = strongly disagree; 7 = strongly agree).
- Q2: I have the authority to decide the activities necessary to achieve the budgets set for my organizational unit (1 = strongly disagree; 7 = strongly agree).
- Q3: My opinion is an important factor in executing the budgets for my organizational unit (1 = strongly disagree; 7 = strongly agree).
- Q4: My organizational unit has the authority and responsibility given by the top-level management to execute the budgets (1 = strongly disagree; 7 = strongly agree).

A.2. Types of control

Please indicate whether the following statements reflect your actual approach to managing your organizational unit

- Q1: When I am evaluating my subordinates for raises or promotion, I always consider their output records (1 = strongly disagree; 7 = strongly agree).
- Q2: I always monitor the people who report directly to me (1 = strongly disagree; 7 = strongly agree).
- Q3: I always observe the way my subordinates perform their tasks (1 = strongly disagree; 7 = strongly agree).
- Q4: I always consider the output of the activities in evaluating my subordinates (1 = strongly disagree; 7 = strongly agree).
- Q5: When evaluating my subordinates, I put more weight on outcomes and less weight on the way my subordinates perform the activities (1 = strongly disagree; 7 = strongly agree).
- Q6: The activities should be performed by my subordinates according to the procedures and prescribed rules (1 = strongly disagree; 7 = strongly agree).

Q7: My organizational unit does not have standard operating procedures to perform activities (1=strongly disagree; 7=strongly agree).

Q8: My organizational unit puts more emphasizes on the output than on the process of obtaining the output (1=strongly disagree; 7=strongly agree).

A.3. Performance

Please rate the performance of your organization unit on the following tasks (1=significantly below average; 7=significantly above average).

1. Planning
2. Investigating
3. Coordinating
4. Evaluating
5. Supervising
6. Staffing
7. Negotiating
8. Representing
9. Your overall performance

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R&D and performance persistence: Evidence from the United Kingdom

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Abstract

There is compelling evidence from both the United States and United Kingdom suggesting that R&D investment is positively related to operating and or market performance. This study extends prior research on R&D and valuation by further examining the sustainability or *persistence* of operating growth and market performance as a result of R&D investments.

We use a large dataset of U.K. companies during the period 1990–2003 and our findings confirm the relation between R&D intensity and consistent growth in Sales and Gross Income, but only in the cases when a firm needs to engage in R&D activity because of the industry in which it operates. Moreover, our evidence indicates not only a positive relation between R&D intensity and subsequent risk-adjusted excess returns among firms that engage in R&D as testified by prior literature, but we also show that R&D intensity improves persistence in excess stock returns: the highest R&D-intensity firms are found to earn higher risk-adjusted excess returns more consistently than the sample median return, compared to lower R&D-intensity firms, as well as firms with no R&D. We interpret this finding as consistent with at least some form of market mispricing.

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1. Introduction

There is strong empirical evidence from the U.S. market that identifies investment in Research and Development as a factor that relates positively to the future level of operating and market performance (e.g. Sougiannis, 1994; Lev and Sougiannis, 1996, 1999; Chan, Lakonishok, and Sougiannis, 2001; Chambers, Jennings, and Thompson, 2002; Penman and Zhang, 2002; Lev, Sarath, and Sougiannis, 2005; Eberhart, Maxwell, and Sidique, 2004). Other evidence from the United Kingdom also testifies that R&D contributes to market performance (Green, Stark, and Thomas, 1996; Al-Horani, Pope, and Stark, 2003). The rationale for the significant positive relation between R&D and future operating performance relates to the economic consequences of possible positive results of the investment. On the other hand, the significant positive relation between R&D intensity and subsequent market performance has been considered by prior literature to be the result of either market mispricing for R&D-intensive firms and/or a compensation for another risk dimension associated with R&D, e.g., scientific innovation risk (Chan, Lakonishok, and Sougiannis, 2001; Chambers, Jennings, and Thompson, 2002; Lev, Sarath, and Sougiannis, 2005). This risk is perceived to be unaccounted for by traditional market factors, such as beta, and book-to-market of firm size, and thus results in excess returns for R&D-intensive firms.

At the same time, Chan, Karceski, and Lakonishok (2003) find indirect evidence to suggest that R&D intensity is linked to *persistence* in operating performance: they find that technology firms display strong persistence in growth rates of operating performance. Chan et al. (2003) though do not examine directly the association between R&D and persistent growth, since they look only at one sector and not at the impact of R&D on the sustainability of growth across all sample firms. Therefore, the *sustainability* of the relationship between R&D and future performance, both operating and market, is an issue that remains unexamined by the literature on R&D and future performance.

The main purpose of this paper is to extend prior evidence on R&D and subsequent operating-valuation by examining directly the impact of R&D investment on the *sustainability* of operating performance growth. We expand prior research on R&D and operating performance with the assessment of the resilience or persistence aspect of corporate growth as a result of R&D. We view that the possibility of a link between R&D and operating-performance persistence may provide insights into the quality of R&D undertaken by firms to the users of financial statements. We argue that when R&D investments have a successful economic outcome, this will be reflected in the persistence of the growth rates of operating performance. At the same time, we predict a positive relation between R&D intensity and persistent operating growth, based on the economic characteristics of the R&D intangible investments. Intangible investments such as R&D are characterized by inherent non-rival use and scalability, and they benefit from economies of network a great deal more than tangible investments (Lev, 2001). Investments in intangibles have also been empirically linked to economies of scale (Hand, 2003). Therefore, if the outcome of these investments is successful, they are expected to work in a way that favors consistency in operating-performance growth.

At the same time, we argue that the existence of possible evidence of persistence in operating performance should ease investors' uncertainty about the quality of recent R&D investments. As already discussed, one of the explanations proposed in the literature on the rationale for the positive relation between R&D and future market performance is market

mispricing. If evidence on persistence in growth resulting from R&D investments can reduce investor uncertainty about the economic consequences of R&D for corporate resilience, this in turn may have direct repercussions on the expectations of market participants and, inevitably, subsequent market valuation.

In this context, the second purpose of this paper is to extend prior evidence on R&D and subsequent market valuation by examining directly the impact of R&D investment on the *sustainability* of market performance. We expand prior research on R&D and market valuation by examining *persistence* in stock returns as a result of significant R&D investments.

At this point, we view that the examination of the sustainability of market performance resulting from R&D should contribute to the discussion on the rationale of the relation between R&D and stock returns for two main reasons. First, we expect that any evidence on R&D and persistent growth should reduce investor uncertainty, thereby influencing market valuation, by making mispricing more difficult. At the same time, though, we do not ignore the possibility that persistence in operating performance may be linked to excess returns in a manner similar to the way momentum has been shown to relate to news that affects expected earnings or earnings growth. Chan, Jegadeesh, and Lakonishok (1996) and Jackson and Johnson (2006) provide evidence that markets respond gradually to new information on corporate operating performance; evidence of this kind is supportive of market mispricing based upon inefficient market response. Second, in an efficient market, there should not be any persistent excess returns since all factors which affect returns should be controlled for. Therefore, the direct assessment of persistence in returns as a result of R&D, after controlling for other risk factors which influence returns, could also in its turn provide some insights into the discussion on whether R&D-related excess market performance is attributed to compensation for R&D-related risk or market mispricing.

The paper extends prior research on R&D and subsequent operating and market performance by assessing directly whether this performance is *sustainable* or not. Prior research on R&D and operating and market performance has not examined whether this relationship is sustainable, as it has focused on assessing the existence of the trend of this relationship under different research designs. As discussed above, we argue that evidence on R&D and resilience in operating growth could ease users of financial statements uncertainty about the economic outcome of R&D, with possible market-valuation implications. We also argue that possible evidence on persistent excess returns due to R&D could provide insights into the ongoing discussion on the rationale for R&D-related market-excess performance. At the same time, the examination of persistence in operating growth together with the examination of persistence in market performance permits us to assess the possible market implications of operating-growth persistence that stems from R&D. It, therefore, makes possible the assessment of the relation between R&D and market performance after having gained specific knowledge of how R&D influences operating-growth persistence.

Leaving aside the persistence issue for a moment, the paper also represents the first attempt to assess R&D and operating performance in general for the U.K. market. It also provides for the first time a complete characterization of the U.K. pattern of growth and persistence of sales, gross earnings, and earnings per share across the whole spectrum of firms listed on the London Stock Exchange (LSE) and the Alternative Investment Market (AIM). In addition, in the process of assessing persistence in stock returns as a result of investments in R&D, the study provides an assessment of the relation between R&D and

returns in general with the use of risk-adjusted returns. The three topics just mentioned have already been examined in the U.S. context [in that sense, in the process of expanding prior evidence on R&D and valuation by examining the impact of R&D on operating growth and stock return *persistence*]. Our study replicates prior evidence found for the United States for the United Kingdom an important market within the global economy, and presents a comprehensive assessment of operating performance together with market performance, as well as their *sustainability* in this market [from the moment some results are replicated in the process of examining the new research questions, it would be wise to report the major differences in the U.K. market context that relate to R&D, and what valuation implications these differences may make].

Although the accounting treatment of R&D is broadly similar in the United Kingdom and United States, R&D spending appears more pervasive in the United States; for example, only about 30% of the U.K. firms report R&D spending in comparison to more than 50% in the United States (Chambers, Jennings, and Thompson, 2002); furthermore, R&D spending in the United Kingdom is concentrated mainly in larger firms compared to United States firms. Corporate R&D activity in the United Kingdom has significantly increased in importance during the time period examined in this study, starting with a total value of firm R&D expense for our sample firms of £5135 million in 1990, to more than double that amount (£11,351 million) in 2003. The two observations that could influence operating and market performance associated with R&D are probable interactions of R&D with firm size and/or the way that the market has learned to capitalize on R&D (given the small percentage of firms that actually undertake R&D activities). Although these differences are not perceived to be very large, they still may account for the different impact of R&D in the United States and United Kingdom [in the extent to which some analyses previously made for the U.S. are replicated with U.K. data in the process of assessing the main research questions].

Our main findings are as follows. First, we show that although R&D does not appear to be associated with a wide spectrum of the sample firms' improvement in persistence in operating growth, it does play a role in operating-growth persistence among firms that engage in R&D because of the *sector* they belong to. This finding applies mainly to measures of operating performance that we find in the higher steps of the income statement (Sales and Gross Income – GI). This constitutes the first evidence of a direct relationship between R&D intensity and persistence in growth, given that the evidence of Chan et al. (2003) indicate increased persistence only in an R&D-intensive sector compared to other sectors, without examining whether R&D directly plays a role in persistence in growth.

Second, we document for the first time for the United Kingdom a positive and significant relation between R&D intensity and future growth in Sales, GI, and EPS after controlling for a number of other relevant factors including industry effects, consistent with prior evidence relative to the United States.

Third, consistent with prior evidence for the United States as well as the United Kingdom, in the case of stock returns, we observe a positive relation between R&D intensity and subsequent risk-adjusted excess stock returns among firms that engage in R&D. We further expand prior literature by finding that R&D intensity also improves *persistence* in excess stock returns: this is expressed as achieving excess returns above the market median excess return for consecutive years. More specifically, we show that the highest R&D – intensity firms earn higher risk-adjusted excess returns than the sample

median return more consistently, compared to lower R&D – intensity, as well as zero-R&D firms. This finding represents the first direct evidence that R&D is positively associated with *persistent* excess stock market returns, for 1 year after another, for a consecutive number of years, after controlling for risk differences among firms arising from firm size and the book-to-market factor.

Overall, we find evidence of a positive association between R&D and subsequent persistence in operating growth only after taking the industry sector into account. In the case of R&D-intensive industries, we find that R&D-intensive firms which belong to R&D-intensive industries do achieve persistent growth. In the case of market performance, though, after controlling for risk differences arising from firm size and the book-to-market factor, we find that R&D intensity plays a role for persistent excess stock returns for each sample, across all sample firms, which in turn do not appear to be industry-specific. Taking the two previous findings on operating and the persistence of market performance into account, we do not observe uniform behavior of operating as opposed to market performance as a result of R&D. In other words, evidence on operating-performance persistence does not appear to ease investors' uncertainty about the quality of R&D [with this increased transparency to be reflected in market performance]. The pattern of behavior for market-performance persistence does not appear to be connected to operating-growth persistence behavior. At the same time, having made use of stock returns adjusted for risk arising from differences in firm size and the book-to-market factor, persistent excess returns are still observed for R&D-intensive firms for a number of years after R&D investments. In an informationally efficient market, in theory, excess returns should in theory, not persist after accounting for all the factors which affect returns. Combining the evidence on differences in the patterns of behavior between operating and market-performance persistence as a result of R&D, along with the existence of persistent excess stock returns for a number of years after initial R&D investment is undertaken, the weight of our evidence is consistent with some form of mispricing related to inefficient market adjustment to the slowly emerging evidence of significant enhancement in operating performance following recent R&D investment.

The paper is organized as follows: In Section 2, we present the sample-selection process and a draft of the methodology used. Sections 3 and 4 contain the empirical results for operating and market performance, respectively, while Section 5 concludes by including references to some limitations of the study.

2. Sample and methodology

The sample of companies used in this study is based on all U.K. listed (in both the London Stock Exchange and the Alternative Investment Market) nonfinancial firms during the period 1990–2003. As the revised SSAP 13, which makes mandatory the disclosure of the amount of R&D expensed on the income statement, was introduced in the United Kingdom for accounting periods beginning on or after the 1st of January 1989, we take 1990 as the starting year in our analysis. Firms have been identified through the London Share Price Database (LSPD-Version 2003). Accounting figures have been taken from the Worldscope database, and information on stock returns and market values from Datastream. For a firm to be included in the study, it must have data on the (positive) book-to-market ratio (BM), market market-value-of-of-equity (MVE), sales and Total Assets (TA) at year-end. Given

that accounting years end at different times during the calendar year in the United Kingdom, we use accounting year-ends for accounting data, and calendar year-ends for market-based data. For example, for a company whose accounting year-ends are on September 1990, we use the MVE at the end of December 1990, and for the BM ratio, we use the book value at financial year-end divided by the MVE at the end of December 1990. Sales and TA are the ones for the accounting year 1990. Firms are classified according to the FTSE Actuaries industry classification.

For purpose of this study, we use the R&D expense taken from the income statement. Although in the United Kingdom SSAP 13 allows the conditional capitalization of development costs, the dominant practice in the United Kingdom is for R&D to be immediately expensed. Previous studies on R&D for the United Kingdom (e.g., Green, Stark, and Thomas, 1996; Al-Horani, Pope, and Stark, 2003) have also relied solely on the R&D expense that appears on the income statement, and therefore the methodology that we use also permits comparability of our studies with previous work. In our sample of companies only 3.3% of firm-year observations report capitalized development costs on the balance sheet, and 2.7% of firm-year observations report amortized development costs on the income statement (8.5% and 6.9% of firms, respectively). The magnitude of the yearly amounts of development costs amortized is also very much lower than the amounts of R&D expensed on the income statement.¹ This way, it is unlikely that relying solely on income statement R&D should result in much loss of information.²

The above sample-selection process results in a total of 15,488 firm-year observations (2182 firms) for the period 1990–2003, out of which 31.4% report R&D (4851 firm-year observations and 770 firms). Increased R&D reporting is observed in the sectors where one would expect significant R&D activity, such as IT Hardware and Pharmaceuticals, with percentages close to 80% of firm-year observations. Electronics and Engineering also exhibit high rates of R&D activity with 69.5 and 54.5%, respectively. It is worth noting that only 54.7% of Software and Computer Services companies report R&D, compared to a significantly higher percentage for Hardware companies. Not surprisingly, firms in Retailing, Household Goods, Leisure, Media and Support Services are engaging in limited R&D activity.

R&D intensity is generally defined in two ways: first, as R&D expense from the income statement divided by annual sales, and second, as R&D expense divided by firm Total Assets. There has not been any extensive market-based measure of R&D intensity used in

¹ Given that Worldscope, which is used in the study for accounting data, does not provide separate items for the amount of Capitalized Development Costs as well as Development Cost Amortization, we have used the items FX FixedAssetsDevelopCostsGross and FX FixedAssetsDevelopCostsAmort from the Extel Database which provides the relevant items separately. The data described in this paragraph are not included in this paper but are available upon request.

² We do not make use of R&D capital calculation since this would make necessary the use of lagged R&D values and our sample period starts in 1990 and only covers 13 years. Therefore we have applied the method first used by Al-Horani, Pope, and Stark (2003) by estimating Pearson correlation coefficients between yearly R&D expense and estimated R&D capital for the period 1994–2003. Given the high Pearson correlation coefficient that we get, it is assumed that yearly R&D expense is a good proxy for R&D activity and, therefore, we do not make use of calculated R&D capital. In addition, when dividing the sample into quartiles according to R&D intensity, we observe that on average, more than 75% (top) and more than 60% (bottom) of firms fall into the same quartile for the next 1 and 2 years. This way, the R&D activity that a firm undertakes over time appears to exhibit a certain degree of stability.

our tests on R&D and operating-growth persistence, such as for example R&D MVE, since the analysis has a great focus on operating performance. There are advantages and disadvantages for each R&D-intensity proxy: for example, R&D TA uses TA for scaling purposes, but to what extent is TA a representative size proxy for an R&D-intensive firm which does not capitalize R&D investments? Or, one could argue that R&D MVE, which does not depend on accounting-related size measures, could easily be driven by the volatility of the denominator. In order to make the analysis as thorough and unbiased as possible, we have used more than one R&D-intensity proxy.

3. R&D and operating performance

3.1. Growth and persistence characteristics

Table 1 shows summary statistics on the R&D Sales and R&D TA ratios for the sample firms throughout the sample period 1990–2003, by reporting quintile breakpoint values, and also gives the median values for each variable in the middle of the quintile breakpoints for each year. The R&D/Sales and R&D/TA ratios have increased steadily from around 1.2% (median values) in 1990 to slightly higher than 4% in 2003. Despite this increase, the R&D-intensity ratios observed for the United Kingdom fall behind the median R&D Sales and R&D/TA ratios in the United States, with values around 6% and 15%, respectively, in the late 1990's (Chambers, Jennings, and Thompson, 2002), indicating a much less intense R&D activity in the United Kingdom. We also observe a high increase in the value of the top R&D-intensity quintile breakpoints as we move towards the end of the sample period: for both R&D/Sales and R&D/TA ratios, the breakpoint for the top 20% of firms started right above 3% for 1990 to end at above 20% for R&D Sales and almost 15% for R&D TA at the end of the sample period. It is also interesting to note the increase in R&D intensity after 1999, which overlaps with the years of the New Economy. This increase in R&D intensity for the United Kingdom after 1999 underlines the importance of the fact that our

Table 1
R&D intensity for the period 1990–2003

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<i>R&D/Sales</i>														
Low	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.8
	0.7	0.7	0.8	0.8	0.8	0.9	1.0	0.9	1.2	1.3	2.0	2.9	2.6	2.6
Median	1.0	1.0	1.2	1.2	1.1	1.3	1.4	1.4	1.8	1.8	3.2	5.3	4.9	4.4
	1.4	1.5	1.6	1.6	1.7	1.7	1.8	2.0	2.4	3.0	5.5	9.4	9.2	6.4
High	3.2	3.0	3.0	3.6	4.1	4.4	4.7	5.7	6.8	7.8	17.9	29.3	25.4	20.6
<i>R&D TA</i>														
Low	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.9	0.8	0.9
	0.9	0.9	0.8	1.0	1.0	1.1	1.1	1.2	1.3	1.2	1.6	2.4	2.6	2.6
Median	1.2	1.2	1.3	1.4	1.5	1.5	1.7	1.8	2.1	2.0	2.7	3.4	4.1	4.1
	1.9	1.7	1.7	1.9	2.1	2.3	2.4	2.6	3.2	3.4	3.9	5.2	6.0	6.1
High	3.6	3.6	3.8	4.3	4.8	5.6	6.1	6.6	8.4	7.7	8.5	12.4	13.8	14.8

The table reports the quintile breakpoint values for the R&D Sales and R&D Total Assets (TA) ratios for the sample firm for the period 1990–2003. Median values for the ratios are reported in the middle.

paper, unlike previous papers for the United Kingdom covers this period. Increased R&D intensity during the end of our sample period may have particular valuation implications arising from these higher R&D investments.

Before moving on to the persistence question, Table 2 provides evidence on the growth rates in sales, positive Gross Income (GI), positive EPS, and Total Assets (a proxy for firm size) per share (quantile breakpoints and median growth values) for some years during the sample period 1990–2003. The number of shares used to calculate growth per share has been adjusted for splits.

We observe from Table 2 that the median growth rates in sales, GI, and TA start from slightly negative values during the first years of the sample period, to generally positive after 1992, reaching their peak around 1994. Therefore, the median growth rates in the measures of operating performance used tend to behave in accordance with the general economic trends for the United Kingdom in the 1990s, where a slow-down in the economy was

Table 2

Growth rates per share during 1990–2003 for Sales, Gross Income, EPS and Total Assets

	90–91	92–93	94–95	96–97	98–99	00–01	02–03	Average
<i>Sales</i>								
Low	-17.8	-11.6	-4.1	-7.5	-10.7	-8.5	-12.7	-10.7
	-6.0	-0.6	5.1	1.2	1.6	4.3	-0.7	0.6
Median growth rate	-2.4	3.2	8.1	4.6	5.5	9.0	3.9	4.5
	1.3	6.6	11.5	8.3	9.3	14.9	8.4	8.4
High	12.5	15.0	22.7	20.0	23.3	33.9	23.5	21.0
<i>GI</i>								
Low	-25.2	-16.7	-7.1	-8.4	-13.6	-16.3	-14.7	-14.6
	-9.6	-0.8	4.4	2.5	1.6	2.0	0.0	0.1
Median growth rate	-4.8	3.1	8.7	7.0	6.5	7.6	5.3	4.9
	0.9	7.5	13.2	11.4	10.9	13.1	9.3	9.7
High	14.0	20.0	26.5	25.9	24.5	35.0	28.5	24.7
<i>EPS</i>								
Low	-44.0	-17.9	-11.6	-19.1	-31.3	-36.4	-30.4	-25.9
	-20.9	4.6	8.5	5.9	0.4	-6.6	3.2	0.1
Median growth rate	-10.8	12.0	15.4	13.6	7.7	3.9	11.2	8.6
	-0.5	18.0	22.0	20.5	15.3	13.0	20.7	16.4
High	16.2	45.2	51.1	48.4	39.5	37.0	61.7	43.1
<i>TA</i>								
Low	-13.7	-12.6	-3.6	-7.0	-8.0	-15.4	-18.2	-11.1
	-4.3	-1.7	3.4	0.5	2.4	-2.2	-5.2	-0.8
Median growth rate	-0.8	1.5	6.0	3.5	5.8	1.9	-1.2	2.9
	2.1	4.5	8.5	7.0	9.8	6.1	3.0	6.4
High	11.7	12.7	17.2	17.1	25.8	20.1	14.4	17.3

The table reports the quantile breakpoint values of the growth rates per share for Sales, positive Gross Income (GI = Sales minus Cost of Goods Sold), positive earnings per share (EPS) and Total Assets (TA) for some years between 1990 and 2003. EPS represents profit after tax, minority interest, and preferred dividends, excluding extraordinary items prior to 1993 and including them after that year due to the implementation of FRS3. Median growth rates are reported in the middle of the quantile breakpoints. Average breakpoint values for the whole sample period are also reported. Growth rates per share have been adjusted for stock splits.

observed in the early years of the decade. Between 1992 and 1994, the median growth rates in sales reach their highest values and range between 3% and 9%. Interestingly, median growth rates in TA return to negative after 2001, which is not the case for either sales or GI growth rates, and the growth rates for TA are the lowest ones compared to the rates for the other variables, with an average of the sample period median values of 2.9%. Growth rates in GI are generally larger than growth rates in sales, both in terms of averages of median values (4.9% for GI and 4.5% for sales) as well as quintile breakpoints. The highest values for all growth rates are achieved around 1999 to 2001, with values around or even greater than 6% for Sales, GI, and TA. The growth rates in terms of EPS exhibit the most volatile behavior, ranging from values above 15% in the mid-90s to below 5% around year 2000–2001, and show the highest average median value of 8.6% during the sample period, compared to the other variables.

To proceed with the *persistence in growth* question, we define and measure persistence as in Chan et al. (2003), i.e., as achieving growth rates, on a per share basis, in the measures of operating performance used, above the median of the overall sample for up to 5 years ahead from each base year. We use three measures of operating performance, Sales, Gross Income (defined as Sales minus Cost of Goods Sold), and EPS (profit after tax, minority interest, and preferred dividends, excluding extraordinary items prior to 1993 and including them after that year due to the implementation of FRS3). Thus, we estimate how many times a company can achieve growth rates per share in measuring the of operating performance in question above the median of the overall sample for up to 5 years ahead from every base year. Then the number of firms with growth rates above the sample median growth rate for the next 1 to 5 years is divided by the total number of firms that survive for the next 1 to 5 years. Median growth rates are calculated using all the available firm observations in a particular year.³ Regarding the EPS measure of operating performance, it is the only one among the three measures used that measures operating performance *after* the expensing of the R&D figure. It can, in this way, be heavily influenced and distorted by this procedure of immediate expensing, especially in the presence of significant R&D. At the same time, this very fact of assessing the persistence in growth behavior of a profit measure *after* the expensing of R&D may provide us with valuable information about how different measures of performance in growth may be affected by the expensing of R&D in terms of persistent growth.⁴

³ When GI or EPS is negative in any base year, in order not to discard a whole sequence of observations, we follow a methodology suggested by Chan et al. (2003) (footnote on p.653). We calculate growth as $((\text{Income} - \text{GI or EPS})_{t+1} - \text{Income}_t) / \text{Stock Price at } t$ and for firms with a negative income value in the base year, we assign a percentile rank for each growth observation. We look up the corresponding percentile value from the distribution of growth rates of firms with positive income in the base year, and this latter growth rate is assigned to the firm with the negative income in the base year. This growth-rate value for the firms with negative income in the base year is thus imputed. As in Chan et al. (2003), we do not report descriptive statistical data in Table 2 based on imputed growth rates, and therefore the growth rates reported on this table are only realized ones, excluding firms with a negative income – GI or EPS – in any base year. In the previous versions of the paper we did not follow growth in GI or EPS in case the operating result in the base year was negative and this led to small changes in the results compared to the ones we report in this version, which are discussed in the relevant parts of the text.

⁴ For example, if firm achieves a growth rate for sales above the median growth rate for 1990–1991 (e.g., 2.4% according to Table 2), it is included in the “persistence” sub-sample. If it achieves a growth rate above the median growth rate for 1991–1992, given that it was above the median for 1990–1991, it is also counted up to 1994–1995 for the base year 1990.

Table 3 presents the average percentage of firms with growth rates above the sample median growth rate for $t+1$ to $t+5$ from every base year, for the whole sample, for R&D and zero-R&D firms, then for the R&D firms according to R&D/Sales and R&D/TA quartiles. On average, 5.2% of the sample firms achieved sales growth above the median in the 5 years after each base year. This percentage becomes 4.8% for Gross Income and 4.7% for EPS. The U.K. results for both sales and GI, are close to Chan et al. (2003) estimates for the U.S. market for their five five-year window, i.e. 6.3% for sales and 3.6% for GI. As one would expect, intuitively, the percentages for sales are slightly higher compared to the ones for GI and EPS, given that a firm has to translate growth in sales into growth in GI and then EPS. Interestingly, the average percentage of firms that achieve a growth rate above the median in EPS 5 years after portfolio formation is quite high at 4.7% compared to just 2.6% for the United States. This finding could be related to survivorship bias; i.e., of the surviving and hence more successful firms, there are positive growth rates in EPS. It could also be received influence by

Table 3
Persistence in operating growth according to R&D intensity

	Sales					GI					EPS				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Sample	50.0	27.7	15.8	9.2	5.2	50.0	26.9	14.7	8.3	4.8	50.0	25.5	13.1	7.6	4.7
R&D	46.2	23.7	12.0	6.0	2.6	46.0	22.9	11.3	5.8	2.4	47.7	22.0	9.5	4.7	2.1
Zero R&D	51.9	29.8	17.8	10.9	6.5	52.0	28.9	16.4	9.7	6.0	51.1	27.3	14.9	9.0	5.9
<i>R&D/TA</i>															
Low	45.9	23.7	11.6	6.3	3.4	46.3	23.1	11.3	6.4	3.6	44.4	17.2	7.1	3.3	1.4
	40.7	18.6	8.7	3.6	0.6	40.8	18.5	8.1	3.7	1.1	45.7	18.4	5.8	1.7	0.3
	45.5	22.1	11.9	6.1	2.1	45.6	21.3	11.5	5.5	1.6	48.3	22.9	10.8	5.6	2.1
High	52.7	30.4	15.8	7.7	3.9	51.8	29.3	14.4	7.5	3.2	53.0	29.7	14.0	8.0	4.2
<i>R&D/Sales</i>															
Low	42.2	20.4	9.9	5.7	2.7	43.0	19.9	8.7	4.1	1.9	44.5	16.9	7.8	3.8	1.7
	41.5	19.7	9.8	4.4	1.4	42.2	20.7	11.0	6.5	3.4	46.3	20.8	7.0	2.1	0.5
	46.9	23.6	12.4	5.5	2.1	46.6	21.8	10.3	3.9	0.8	47.0	19.9	8.4	3.9	1.3
High	54.2	30.8	15.9	8.3	4.0	52.6	29.8	15.3	8.6	3.6	53.2	30.3	14.5	9.0	4.5

The table reports the average % of firms with growth rates in Sales, Gross Income (GI = Sales minus Cost of Goods Sold) and earnings per share (EPS) above the sample median for the next 1 to 5 years, first for the whole sample, then for R&D and zero R&D firms, and finally for the R&D firms only according to R&D/Sales and R&D/Total Assets (TA) quartiles (from low to high). EPS represents profit after tax, minority interest, and preferred dividends, excluding extraordinary items prior to 1993 and including them after that year due to the implementation of FRS3. Market values are taken at calendar year-ends e.g., December 1990. In case GI or EPS is negative in any base year, in order not to discard a whole sequence of observations, we follow a methodology suggested by Chan et al. (2003) (footnote on p. 653). We calculate growth as $((\text{Income} - \text{GI or EPS})_{t+1} - \text{Income}_t) / \text{Stock Price at } t$ and for firms with a negative income value in the base year, we assign a percentile rank for each year's observation. We look up the corresponding percentile value from the distribution of growth rates of firms with positive income in the base year, and this latter growth rate is assigned to the firm with the negative income in the base year. This growth rate value for the firms with negative income in the base year is thus imputed. As in Chan et al. (2003), we do not report descriptive statistical data in Table 2 based on imputed growth rates, and, therefore, the growth rates reported on this table are only realized ones, excluding firms with a negative income in the EPS or GI any base year.

the fact that we use imputed EPS growth rates when earnings in a base year get negative values (footnote 3).

On average, zero-R&D firms exhibit more persistent growth rates compared to the R&D firms for sales, GI, and EPS for every time window from $t+1$ to $t+5$. For zero-R&D firms, 6.5% of firms achieve a growth rate in sales above the sample median growth rate 5 years after portfolio formation (6% for GI and 5.9% for EPS), compared to 2.6%, 2.4% and 2.1% for R&D firms in the respective measures of operating performance. Limiting the analysis within the R&D sample only, the top R&D-intensity quartile clearly exhibits the best persistence results, in terms of Sales, GI, and EPS – no matter which proxy for R&D intensity is used (R&D/Sales or R&D/TA), with percentages around 4% for Sales, 3.5% for GI, and 4% for EPS of firms – to show growth rates above the median after 5 years. Generally persistence in growth tends to improve as R&D intensity increases, with the two highest R&D-intensity quartiles exhibiting improved persistence results compared to the lower ones, but, even the top R&D-intensity firms show, for some time windows, worse persistence in growth compared to zero-R&D firms overall.

Next we assess persistence in growth for R&D firms, R&D-intensive firms, and zero-R&D firms matched according to firm size, using MVE as the proxy for size, and the book-to-market ratio. The fact that we perform MVE–BM matching and then assess the performance of firms that differ in terms of R&D intensity implies that we expect that information on the future performance of a firm contained in its degree of R&D intensity is neither captured by MVE nor by BM. This argument relates to the very core of our research hypothesis (and all relevant research on the association between R&D and future operating performance), that R&D investments are intangible investments of a scientific nature and we, therefore, expect that they are able to produce externalities that will influence future operating growth. In addition, the book value included in the BM-ratio calculation does not generally include R&D investments due to current accounting treatment. In this context, when comparing two firms of the same size and BM characteristics but of different R&D intensity, we expect that the possible externalities inherent in R&D investment should contain more information than we would get from firm size or the BM multiple.

The sample firms are divided into two MVE portfolios, using the median MVE as of the end of December in each year. Then the firms in each of the two MVE portfolios are divided into three book-to-market (BM) portfolios: one containing the lower 30% values for BM, another one with the middle 40%, and finally, a portfolio containing the top 30% of the BM ratios. This results in six size-value portfolios (two by three size-BM portfolio analysis). Portfolio breakpoints are rebalanced every year, and the average percentages of firms with growth rates in Sales, GI, and EPS above the sample median growth rates, for $t+1$ to $t+5$ from every base year is calculated, for the R&D and zero-R&D firms, as well as for firms with R&D/TA ratios above the sample median every year (the R&D-intensive firms), which belong to each portfolio. The relevant results are reported on Table 4.

A casual comparison of the persistence patterns between R&D and zero-R&D firms, is sufficient to suggest that R&D investment does not enhance consistency in all of the six portfolios for Sales, GI, and EPS, and the zero-R&D firms generally exhibit higher persistence in growth compared to the R&D and R&D-intensive firms. However, when we focus only on the R&D population, on average, the R&D-intensive firms show a higher percentage of improved persistence in operating growth compared to the general population

Table 4

Persistence in operating growth for R&D, zero-R&D and R&D-intensive firms matched according to MVE and BM

	Sales					GI					EPS				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
<i>R&D firms MVE-BM</i>															
Low-low	51.6	27.3	14.1	7.0	4.2	53.3	27.0	11.7	7.9	4.3	57.0	27.2	13.0	10.5	8.8
Low-mid	41.0	19.0	8.1	3.0	0.4	42.2	20.0	7.9	3.3	0.9	49.5	27.7	12.3	8.2	4.6
Low-high	34.2	13.5	5.0	2.6	0.7	34.2	13.1	4.3	0.5	0.7	54.1	31.4	11.6	3.6	0.0
High-low	56.3	31.5	18.1	10.2	4.4	55.1	30.4	16.7	8.0	2.8	50.5	24.3	10.3	3.4	0.9
High-mid	45.7	22.4	11.0	5.2	2.0	44.1	19.4	8.9	4.2	1.4	42.0	16.4	7.7	3.8	1.0
High-high	39.1	20.9	10.4	5.1	2.8	39.5	22.1	12.7	8.0	4.3	42.9	18.9	7.2	3.2	2.0
<i>Zero R&D firms MVE-BM</i>															
Low-low	62.5	38.6	25.9	17.7	13.3	57.4	31.8	18.9	10.9	8.4	55.5	32.8	18.8	12.5	9.1
Low-mid	51.9	26.2	14.2	8.9	4.7	48.4	25.9	12.7	6.6	3.8	49.8	25.4	14.4	8.2	4.9
Low-high	39.6	19.3	10.3	5.1	1.4	40.2	20.5	9.9	5.7	2.5	50.1	29.1	14.8	8.1	4.2
High-low	65.1	41.3	25.7	16.7	11.6	62.8	38.1	23.2	13.8	8.4	55.1	28.7	15.3	8.4	6.3
High-mid	58.9	34.7	19.9	10.5	5.2	57.3	32.3	19.0	10.9	6.2	49.0	24.0	11.7	6.4	2.4
High-high	48.5	27.9	16.6	10.8	6.5	48.7	26.6	16.2	11.0	7.7	48.1	25.2	15.4	11.2	9.5
<i>R&D/TA above median firms MVE-BM</i>															
Low-low	52.3	27.2	12.5	5.7	3.1	55.6	29.2	13.3	10.1	5.5	59.2	30.5	14.4	12.1	9.3
Low-mid	42.8	20.0	8.9	3.4	0.0	45.3	22.1	9.5	3.8	0.9	54.0	32.8	15.5	10.0	5.6
Low-high	40.3	21.8	9.3	3.4	0.0	37.1	20.8	9.9	0.0	0.0	55.1	41.1	16.6	4.5	0.0
High-low	58.9	34.3	19.7	11.3	5.5	56.0	31.6	18.4	8.6	3.0	51.3	25.7	11.6	3.8	0.9
High-mid	45.5	22.7	12.5	6.3	3.1	43.5	20.5	9.9	4.9	1.2	39.1	19.0	10.3	6.5	2.0
High-high	31.6	15.7	6.9	1.4	0.0	30.1	13.7	4.6	2.9	1.8	46.8	28.2	22.9	20.1	18.8

The sample firms are divided into two market-value-of-equity (MVE) portfolios, using the median MVE as of the end of December in each year. Then the firms in each of the two MVE portfolios are divided into three book-to-market (BM) MVE for BM ratio taken at calendar year-end) portfolios: one with the lower 30% values for BM, another with the middle 40%, and one with the top 30% of BM ratios, resulting in MVE-BM annually rebalanced portfolios. The table reports the average % of firms with growth rates in Sales, Gross Income (GI = Sales minus Cost of Goods Sold), and earnings per share (EPS) above the sample median for the next 1 to 5 years for the R&D, zero-R&D and R&D-intensive firms that belong to each of the six portfolios. R&D-intensive firms are defined as the ones with R&D Total Assets (TA) above the sample median R&D/TA ratio for a particular year. EPS represents profit after tax, minority interest, and preferred dividends, excluding extraordinary items before 1993 and including them afterwards due to FRS3 introduction. In case GI or EPS is negative in any base year, in order not to discard a whole sequence of observations, we follow a methodology by Chan et al. (2003). We calculate growth as $(\text{Income}_t - \text{GI or EPS})_{t-1} / (\text{Income}_{t-1} - \text{Income}_t) / \text{Stock Price at } t$ and for firms with a negative income value in the base year, we assign a percentile rank for each growth observation. We look up the corresponding percentile value from the distribution of growth rates of firms with positive income in the base year, and this latter growth rate is assigned to the firm with the negative income in the base year.

of the R&D firms. This result holds when R&D intensity is expressed either in terms of the R&D/TA and the R&D/Sales ratio (untabulated data). An interesting observation is that in the case of EPS growth, persistence in growth appears to be particularly strong for some portfolios for high R&D/TA firms, in contrast to the relevant results for sales and GI. We attribute this finding to the methodology used when earnings in the base year get negative values, and imputed growth rates are used (as explained in footnote 3) so a whole sequence of observations can be retained. This method is especially useful when a bad year is followed by particularly good performances in the years that follow. When only realized growth rates

are used (i.e., not following growth in the negative base year (untabulated results)), there is no sign for persistence in growth for high R&D firms for either Sales, GI, or EPS and this result also appears to hold true for every single time window used, particularly for the five-year time window.

The above size-BM matching analysis, performed for the whole sample, lacks controls for possible industry effects, which could pose significant limitations to the analysis. Thus, in addition to size-BM matching, we repeat the above analysis for three separate industries, with enough firm-year observations to permit meaningful portfolio construction for R&D, zero-R&D and R&D-intensive firms. According to FTSE Actuaries classification, these are: *Information Technology* (that group, the sectors of Information Technology Hardware and Software and Computer Services), *General Industries* (which includes Aerospace and Defense, Diversified Industrials, Electronic and Electrical Equipment, Engineering and Machinery), and the *Health and Pharmaceuticals and Biotechnology* sectors grouped together (called *Pharma* onwards). The Pharma grouping does not correspond to a specific FTSE Actuaries Industry definition, but we chose to group them together given the closeness of their operations.

We perform a 2 × 2 MVE–BM portfolio construction within each of the three industry groups defined. First, within each industry, the firms are divided in two MVE groups (employing MVE as of the end of December), using the median industry MVE. Each MVE portfolio is then divided into two annually rebalanced BM Portfolios. We then assess the persistence in growth results for the R&D firms, zero-R&D firms, and R&D-intensive firms (firms with R&D TA ratios above the industry median) that belong in each of the four MVE–BM portfolios.

Table 5 (Panels A, B and C) show persistence estimates for *IT*, *General Industries*, and *Pharma*, respectively. In sharp contrast to the previous table, we now observe for the three industry groups more persistent growth rates in sales and GI for the R&D-intensive firms, in comparison to the zero-R&D firms and R&D firms in general. This result is not consistent within each of the four MVE–BM portfolios, but for the majority of the portfolios in each of the three industries it is more pronounced for the three-year window. This result underlines the positive influence of R&D for performance consistency within an R&D-intensive industry.

More specifically, in the case of *Information Technology* and with the exception of the low MVE–low BM portfolio for both sales and GI, the R&D-intensive firms within the industry generally exhibit the most persistent growth rates, followed by the R&D firms in general and then by the zero-R&D firms. This result is repeated for *General Industries*, where R&D-intensive firms generally exhibit the best persistence in growth results for all four portfolios, compared to the R&D firms overall and the zero-R&D firms. Finally, the same results are more or less observed for *Pharma*, with the exception of the low MVE–low BM portfolio (which was the case for the IT industry) and zero-R&D firms had the most persistent growth in sales and GI. As a general comment, the R&D-intensive firms within each industry show exceptionally strong persistence in growth in the three three-year time window. The previous results hold when dropping the use of imputed growth rates in case GI is negative in the base year, and using only realized growth rates, by not following growth when GI in the base year is negative (untabulated results).

When examining persistence in EPS within these R&D-intensive industries, there are again signs for high R&D firms to exhibit improved persistence in terms of EPS growth

Table 5

Persistence in operating growth for R&D, zero-R&D and R&D-intensive firms matched according to MVE and BM within their industry

		Sales					GI					EPS				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
<i>Panel A: Information technology</i>																
<i>R&D firms MVE–BM</i>																
Low–low		41.3	12.2	1.8	0.0	0.0	50.7	22.0	4.1	2.5	0.0	57.2	18.0	7.6	6.3	14.3
Low–high		47.6	22.6	9.2	3.3	0.0	47.4	29.0	12.3	6.8	2.8	62.9	41.2	21.7	14.5	9.4
High–low		59.5	41.1	26.5	12.3	3.7	56.3	35.3	22.0	8.8	3.7	56.7	36.0	21.5	4.2	0.0
High–high		46.8	26.0	20.2	12.9	5.5	50.0	26.1	15.6	7.6	3.2	51.5	26.2	12.2	9.7	7.1
<i>Zero-R&D firms</i>																
Low–low		50.4	29.5	22.3	21.2	16.8	59.1	31.8	23.4	24.1	21.6	61.3	31.0	18.9	12.5	3.7
Low–high		38.1	21.1	12.7	10.3	5.6	37.9	22.3	7.5	3.7	4.2	60.1	45.5	26.7	12.5	0.0
High–low		57.9	37.6	23.3	11.2	4.4	62.7	33.7	17.1	7.8	2.2	64.9	36.5	19.9	13.9	0.0
High–high		47.4	28.5	17.6	7.5	5.6	53.7	27.6	12.9	3.3	0.9	49.5	40.0	28.1	16.4	17.1
<i>R&D/TA above median firms</i>																
Low–low		36.0	13.4	0.0	0.0	0.0	46.0	21.7	4.5	0.0	0.0	60.0	20.2	15.0	14.3	16.7
Low–high		50.7	26.4	18.2	10.0	0.0	54.5	31.3	18.5	11.1	0.0	61.1	43.8	28.8	25.0	20.4
High–low		59.7	46.1	31.2	5.0	0.0	56.2	38.5	28.9	5.0	0.0	66.1	48.7	29.8	0.0	0.0
High–high		48.3	28.5	23.5	13.3	0.0	54.4	31.2	18.2	11.7	0.0	51.1	30.1	24.1	21.4	16.7
<i>Panel B: General Industries</i>																
<i>MVE–BM R&D firms</i>																
Low–low		44.1	21.5	11.4	4.7	2.4	45.1	20.5	10.3	7.4	5.3	48.1	25.6	16.9	13.9	7.4
Low–high		33.2	13.1	6.1	2.1	0.0	35.3	13.3	4.3	0.7	0.0	49.7	26.9	13.2	3.9	3.2
High–low		56.4	31.0	16.1	10.0	7.2	55.1	30.6	15.6	8.2	2.6	43.9	18.2	7.4	2.8	0.5
High–high		34.5	15.8	7.6	3.6	0.9	36.9	17.3	9.3	4.7	2.6	44.2	19.3	8.5	6.6	2.7
<i>Zero-R&D firms</i>																
Low–low		45.1	22.1	12.7	5.7	0.4	50.0	22.5	12.4	4.1	0.0	54.7	29.5	17.6	12.0	8.4
Low–high		34.4	19.4	9.7	5.1	1.4	37.4	19.2	9.2	4.9	1.5	48.2	23.1	9.6	3.8	3.0
High–low		54.4	26.1	8.9	4.3	2.5	54.3	27.6	5.3	5.0	0.7	55.5	21.4	8.2	4.7	2.2
High–high		39.6	16.4	6.8	2.5	0.9	41.3	15.5	7.0	2.8	0.0	41.5	15.3	6.3	1.7	0.0
<i>R&D/TA above median firms</i>																
Low–low		46.8	25.4	13.3	6.0	3.2	49.7	25.0	15.7	11.3	8.1	51.8	30.6	19.6	14.4	8.7
Low–high		37.6	19.3	11.5	6.2	0.0	36.1	18.5	10.5	1.7	0.0	56.3	33.5	17.0	5.8	3.7
High–low		58.3	35.1	20.6	15.1	10.7	54.4	31.9	17.1	10.6	3.8	44.6	19.6	8.8	2.7	0.0
High–high		36.9	17.5	4.5	0.7	0.0	38.4	16.8	7.2	2.7	1.1	51.3	28.4	19.2	14.4	9.3
<i>Panel C: Health, Pharmaceuticals and Biotechnology (Pharma)</i>																
<i>R&D firms</i>																
Low–low		62.4	34.4	23.4	22.3	11.1	60.5	31.5	26.8	16.0	5.9	49.6	24.9	5.2	3.7	3.1
Low–high		52.2	32.1	14.0	5.8	3.7	51.7	31.9	9.7	5.8	0.0	56.5	34.0	12.0	5.8	0.0
High–low		63.9	39.8	19.1	10.3	3.4	61.8	34.6	16.6	6.0	4.1	50.3	22.1	9.3	3.3	0.0
High–high		50.0	24.2	10.4	5.4	4.2	52.7	28.7	17.2	15.6	6.6	48.0	27.0	10.0	6.5	2.8
<i>Zero-R&D firms</i>																
Low–low		69.7	43.9	30.8	19.3	16.5	55.4	34.7	22.7	18.9	14.8	47.5	13.0	1.4	0.0	0.0
Low–high		48.9	29.3	19.1	9.3	1.1	53.3	28.9	11.9	4.3	1.2	37.7	17.6	9.5	3.5	0.0
High–low		46.2	18.1	4.5	0.0	0.0	50.0	34.8	25.0	9.5	5.6	27.8	0.0	0.0	0.0	0.0
High–high		53.0	33.0	13.7	6.4	5.6	57.7	33.1	16.4	2.5	2.8	47.2	25.0	11.7	6.7	5.6

Table 5 (continued)

	Sales					GI					EPS				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
<i>Panel C: Health, Pharmaceuticals and Biotechnology (Pharma)</i>															
<i>R&D/TA above median firms</i>															
Low–low	50.9	24.1	18.0	16.7	5.6	60.0	38.3	44.0	41.7	10.0	49.0	27.4	5.9	2.5	0.0
Low–high	57.7	38.3	12.4	0.0	0.0	65.0	41.7	14.3	0.0	0.0	62.5	42.9	38.9	20.0	0.0
High–low	62.6	37.2	10.8	7.5	2.8	55.1	32.0	15.2	5.3	7.4	50.1	25.7	8.3	0.0	0.0
High–high	68.5	36.0	17.0	5.8	3.7	63.3	29.5	15.0	12.5	0.0	55.1	35.4	21.2	15.0	14.3

A total of four MVE–BM annually rebalanced portfolios were created for three industry groups: Information Technology (IT), General Industries and Health grouped together with Pharmaceuticals and Biotechnology (Pharma), by dividing the sample firms into each industry group into two market-value-of-equity (MVE) portfolios, using the median MVE as of the end of December in each year, and then dividing the firms in each of the two MVE portfolios into two book-to-market (MVE–BM for BM ratio taken at calendar year-end) portfolios. The table reports the average % of firms with growth rates in Sales, Gross Income (GI = Sales minus Cost of Goods Sold) and EPS above the sample median for the next 1 to 5 years for the R&D, zero-R&D and R&D-intensive firms that belong to each of the four portfolios for a particular industry. R&D-intensive firms are defined as the ones with R&D Total Assets (TA) above the industry median R&D TA for a particular year. EPS represents profit after tax, minority interest, and preferred dividends, excluding extraordinary items prior to 1993 and including them after that year due to the implementation of FRS3. In case GI or EPS is negative in any base year, in order not to discard a whole sequence of observations, we follow a methodology suggested by Chan et al. (2003) (footnote on p. 653). We calculate growth as $(\text{Income} - \text{GI or EPS})_{t-1} - \text{Income}_{t-1}$ Stock Price at t and for firms with a negative income value in the base year, we assign a percentile rank for each growth observation. We look up the corresponding percentile value from the distribution of growth rates of firms with positive income in the base year, and this latter growth rate is assigned to the firm with the negative income in the base year. The results for IT, General Industries and Health grouped together with Pharmaceuticals and Biotechnology are reported in panels A, B, and C, respectively.

compared to zero-R&D firms and R&D firms in general. Interestingly though, when we abandon the use of imputed growth rates in case EPS is negative in the base year, and we use only realized growth rates, by not following growth when EPS in the base year is negative (untabulated results), there appears to be no evidence to suggest that R&D intensity is related to persistence. In that case, most R&D-intensive firms appear to exhibit improved persistence in EPS only in the case of *General Industries*. The highly R&D-intensive firms in *IT* and *Pharma*, do not exhibit signs of improved persistence in EPS, and thus the trend observed in persistence in sales and GI growth, does not hold for EPS as well. Finally, the results on Table 5 hold true when we replace R&D/TA with R&D. Sales in order to define R&D-intensive firms (untabulated data).

In short, our findings from Tables 4 and 5 suggest that R&D intensity plays a role for persistence only within industry sectors that are intensive in R&D by definition due to the very nature of their operations; all four industry groups included in the industry-matching analysis present high percentages of R&D reporting as has been discussed previously. Although we do not imply that “R&D investments are a proxy for industry membership” (Al-Horani, Pope, and Stark, 2003), we expect that R&D activity will be more important for firm operations in maintaining a competitive advantage in certain sectors only. In the first stage of our MVE–BM portfolio matching analysis, when all the sample firms were used without industry matching, the sample also included a large number of observations from the *Support Services*, *Media*, and *Leisure* sectors, all of which report very little R&D.

These sectors have been generally successful during the 1990s, and we would expect that R&D activity can be less crucial in these sectors than it is for example *IT*. It could, therefore, be the case that the very good persistence results for the sectors that do need to engage in significant R&D activity are actually driving the persistence results in favor of the zero-R&D firms when we perform a simple MVE–BM matching without a control for the industry. In the second case, though, when we compare the performance amongst firms in the same sector and we assess persistence within industries that require the involvement in R&D for a firm to remain competitive, the R&D investment appears to play a much more important role for persistent growth.

Consideration of median R&D/TA ratios for *IT*, *General Industries*, and *Pharma* for the period between 1990–2003, at 7.5, 2.2, and 9.5%, respectively (7.1, 1.6 and 4.8 for R&D/Sales), is particularly interesting, since *IT* and *Pharma* are significantly more R&D-intensive sectors than *General Industries*. EPS is the only item after the expensing of R&D that we use, and thus it can very well be “understated” by the amount of R&D involved in a particular year, especially in the case of R&D-intensive firms. When we make use of imputed growth rates for firms with negative EPS in the base year as is done in Table 5, there are signs for persistent growth in EPS as in Sales and GI for R&D-intensive firms within the R&D-intensive industries examined. If we make use of actual growth rates, by discarding a whole sequence of observations if EPS in the base year is negative (untabulated results), there are no signs for persistence in EPS for R&D-intensive firms within R&D-intensive industries. This way, a trend observed in measuring operating growth *before* expensing of R&D, appears to be reversed in the case of very R&D-intensive industries, such as *IT* or *Pharmaceuticals*. We attribute the inconsistency in the findings for EPS persistence, when imputed as opposed to realized growth rates are used for negative EPS base-year firms, to the observation that the use of imputed EPS growth rates can account for the cases where operating results are unfavorable for a certain year, but they are followed by particularly good performance in subsequent years. By not eliminating a whole sequence of observations if EPS in the base year is negative permits us to capture persistence in EPS growth for these R&D-intensive firms with such reversals in their performance, and thus justifies the inconsistency in the results described.⁵

3.2 Regression results

Leaving our basic R&D and persistence in growth research question aside for a moment, for reasons of completeness of our analyses, we examine the relationship between long-term growth rates of operating performance and other possible effects of R&D intensity in

Information on the number of firm-year observations for Tables 3, 4 and 5 was included in a previous version of the paper in the Appendix. In addition, a self-built limitation of this type of study on persistence is that it only uses the firms that survive for the next 1 to 5 years from each base year. This way, the analysis is only based on firms with rates of the surviving, and, therefore, probably more successful firms. Thus, by including the growth rates of more successful firms, the persistence results could be biased upwards. We, therefore, performed a control analysis as used by Chan et al. (2003), by calculating the persistence results for the next 1 to 3 years, for those firms that survive for a full five year period after each base year, and for the firms that do not survive for more than 3 years. As one would intuitively expect, firms that survive exhibit improved persistence results over the three three-year window, compared to non survivors (untabulated data).

the United Kingdom. We build on the same basic model of Chan et al. (2003) with some modifications in the right-hand side variables on the treatment of possible econometric problems. The examination of the impact of R&D on operating growth represents a replication of some modifications of a similar model applied by Chan et al. (2003) to the U.S. sample. However, we proceed with this type of analysis for reasons of completeness in order to assess the general impact of R&D on growth for the U.K., leaving aside for a moment our main research question which relates to the assessment of the influence of R&D on *performance in growth*.

Our first addition to the Chan et al. (2003) model is to include a dummy variable to assess the influence of past persistence. Furthermore, Chan et al. (2003) take the right-hand side variables at time zero and the dependent-growth variables cover growth in the next 1 to 5 years. In this case, though, something has changed in the company fundamentals during that time, it will not be reflected in the right-hand side variables and, consequently, this information will not be used in the model estimation. For example, if a firm undertook R&D activities in year three from the base year of the analysis ($t + 3$) and we regress operating growth over the next 1 to 5 years (from t to $t + 5$), we will have missed the information that this firm has actually taken up R&D activities in the time period that the dependent variable covers, just because the firm had no R&D spending at time zero. In order to overcome this problem, one could use averages of the independent variables during the time period. However, if one chose to use averages in such a way, explanatory variables would be measured contemporaneously with operating performance and, it would thus be difficult to distinguish whether R&D investment is driving operating performance, or vice versa. Thus, either way, the regression this model specifies appears problematic. We choose a solution in the middle of these two methods, using static versus contemporaneous, with the dependent right-hand side variables: We use averages of the independent variables only until the year immediately previous to the final year of the time period, which the dependent variable covers. Taking all the right-hand side variables at time zero, as in Chan et al. (2003), serves the objective of drawing conclusions about the predictive power of these variables for future growth in operating performance. Our objective is to assess the overall impact of R&D intensity, among other control variables, on the future growth rates in Sales, Gross Income, and EPS, and at the same time to avoid as much as possible the problem of not distinguishing between whether the regressor is influencing the dependent variable or vice versa. We choose to pursue it by making this model choice appear less problematic with respect to all the issues raised above.

The following regression is run with OLS using panel data for the whole sample for the period 1990–2002:

$$GR = \beta_0 + \beta_1 RD + \beta_2 MV + \beta_3 BM + \beta_4 PERSDUMMY + \beta_5 PASTR + e_{it} \quad (1)$$

Where:

GR — Cumulative growth in a) Sales, b) Gross Income (Sales – COGS) or c) EPS (profit after tax, minority interest, and preferred dividends, excluding extraordinary items prior to 1993 and including them after that year due to the implementation of FRS3) for the next 1 to 5 years from each base year. Firms with a negative value of GI and EPS in the base year are excluded.

RID = Average R&D Sales or R&D Total Assets until the year immediately previous to the final year of the time period the dependent variable covers. For example, when we assess operating growth from year t to $t+1$, we take static R&D/Sales or R&D/TA as of year t . When we assess operating growth from year t to $t+5$, we use the average R&D/Sales or R&D/TA of the years t to $t+4$.

MVE = Average MVE until the year immediately previous to the final year of the time period the dependent variable covers.

Table 6
R&D and the rate of growth in future Sales, Gross Income, and EPS

Growth in	MVE	RDSALES	BM	PASTR	PERSDUMMY	Constant	Adj R^2	F statistic
<i>t, t-1</i>								
Sales	0.0017 (1.2447)	0.0048 (4.6382)	-0.0304 (-7.0556)	0.4855 (7.0453)	0.0000 (0.0041)	0.0082 (1.2803)	0.0223	48.8009 (0.0000)
GI	0.0011 (0.6033)	0.0043 (3.2082)	-0.0331 (-6.3659)	0.3587 (4.1766)	-0.0210 (-2.9193)	0.0066 (0.7762)	0.0113	23.8764 (0.0000)
EPS	-0.0095 (-2.4830)	0.0013 (0.4463)	-0.0690 (-7.6806)	0.2410 (1.2378)	-0.0679 (-5.4250)	0.0345 (1.8562)	0.0100	16.1247 (0.0000)
<i>t, t-2</i>								
Sales	0.0050 (2.0349)	0.0120 (7.1297)	-0.0601 (-9.1451)	0.4526 (4.2497)	-0.0139 (-1.4831)	0.0041 (0.3668)	0.0259	48.5838 (0.0000)
GI	0.0065 (2.1747)	0.0134 (6.6371)	-0.0704 (-8.8370)	0.1818 (1.4518)	-0.0412 (-3.6623)	-0.0039 (-0.2886)	0.0207	37.1279 (0.0000)
EPS	-0.0087 (-1.6234)	0.0136 (3.7212)	-0.1096 (-8.6687)	-0.1074 (-0.4322)	-0.1106 (-6.4738)	0.0940 (3.5476)	0.0189	23.5552 (0.0000)
<i>t, t+3</i>								
Sales	0.0057 (1.7359)	0.0145 (6.6135)	-0.0718 (-7.9323)	0.5190 (3.7738)	-0.0240 (-1.9253)	0.0209 (1.4062)	0.0228	35.6196 (0.0000)
GI	0.0073 (1.8809)	0.0165 (6.6643)	-0.0722 (-6.9234)	0.3634 (2.2403)	-0.0238 (-1.6669)	0.0165 (0.9164)	0.0173	26.0426 (0.0000)
EPS	-0.0137 (-2.1314)	0.0211 (4.9233)	-0.1377 (-9.1796)	-0.0487 (-0.1701)	-0.1434 (-6.9360)	0.2136 (6.6773)	0.0281	27.5588 (0.0000)
<i>t, t+4</i>								
Sales	0.0063 (1.5136)	0.0188 (6.8382)	-0.0630 (-5.3942)	0.7492 (4.2868)	-0.0320 (-2.0467)	0.0539 (2.8629)	0.0189	24.6334 (0.0000)
GI	0.0100 (2.0425)	0.0198 (6.3407)	-0.0729 (-5.4557)	0.4201 (2.0154)	-0.0311 (-1.7442)	0.0350 (1.5575)	0.0150	18.9693 (0.0000)
EPS	-0.0299 (-3.8405)	0.0232 (4.5681)	-0.1537 (-8.1919)	-0.8712 (-2.3172)	-0.1823 (-7.2637)	0.3954 (10.2614)	0.0384	29.4511 (0.0000)
<i>t, t+5</i>								
Sales	0.0040 (0.7922)	0.0218 (6.6577)	-0.0721 (-4.9867)	0.6089 (2.6991)	-0.0529 (-2.7992)	0.0841 (3.7655)	0.0168	18.2407 (0.0000)
GI	0.0074 (1.2554)	0.0212 (5.6181)	-0.0760 (-4.6697)	0.1358 (0.5270)	-0.0366 (-1.7032)	0.0681 (2.5197)	0.0111	11.9251 (0.0000)
EPS	-0.0410 (-4.6306)	0.0290 (4.9595)	-0.1775 (-7.4597)	-1.3943 (-3.1365)	-0.1694 (-5.6404)	0.5298 (12.3874)	0.0487	29.2108 (0.0000)

BM	Average book-to-market ratio until the year immediately previous to the final year of the time period the dependent variable covers.
PERSDUMMY	Dummy variable taking the value of one if the company exhibited persistence in the measure of operating performance that GR represents each time (Sales or Gross Income or EPS), over the past 2 years (achieved growth rates above the sample median in each of the past 2 years), and zero otherwise.
PASTR	The stock's 6 month prior to year end (<i>t</i>) compound rate of return (geometric mean).

Table 6 presents the coefficient estimates and values of *t*-statistics (in parentheses) that have been estimated by running the panel data Eq. (1), when the dependent variable GR equals the growth in sales or GI or EPS for the next 1 to 5 years. The regression is run using OLS and White's heteroskedasticity robust standard errors.

According to the results reported on Table 6 for the *t, t + 1* time window, all regressors except for the past-persistence dummy and MVE variables appear statistically significant for the Sales regression; this is also the case for the GI regression, with the persistence dummy being also statistically significant. In the case of the EPS regression, the R&D-intensity variable is positive but not statistically significant, and neither is the past-return variable. All variables are positive in the Sales regression, with the exception of BM, a fact that is quite intuitive. In the GI and EPS regressions, the persistence dummy, in addition to BM, is also negative, providing another indication of mean reverting profitability. The constant term is positive and not statistically significant. The MVE variable is positive in the Sales and GI regressions, but turns to negative in the EPS one, and is significant at all times. We observe that, even after controlling for other variables, the R&D/Sales variable is positive and statistically significant at 1% significance level in the Sales and GI regressions, but not in the EPS one.

Regarding the results for the *t, t + 2* until the *t, t + 5* time windows, the past-persistence dummy variable PERSDUMMY has in every case a negative sign. The coefficient of the past-returns variable PASTR has a positive sign and is statistically significant in the Sales and GI regressions and a negative sign in the EPS one, but is of limited overall significance in the EPS regression. The coefficient for BM is negative as intuitively expected, and exhibits very strong significance almost in every regression. It is in every case, statistically significant for all of the

Notes to Table:

The table reports the coefficient estimates and values of *t*-statistics (in parentheses) estimated by running the following panel-data regression with OLS: $GR = \beta_0 + \beta_1 MV + \beta_2 RDSALES + \beta_3 BM + \beta_4 PASTR + \beta_5 PERSDUMMY + \epsilon$ (Eq. (1)). The dependent variable GR equals cumulative growth in a) Sales b) Gross Income (GI = Sales – Cost of Goods Sold) or c) EPS over the next 1 to 5 years. MVE, BM, RDSALES equal the average market market-value-of-of-equity, book-to-market ratio, and R&D/Sales, respectively, until the year immediately previous to the final year of the time period which the dependent variable GR covers. PASTR equals the stocks prior to the end of *t* six month compound rate of return. PERSDUMMY is a dummy variable taking the value of one if the company achieved a growth rate in Sales or GI or EPS above the sample median in each of the past 2 years, depending on which measure of operating performance that GR represents each time (Sales or GI or EPS), and zero otherwise. MVE is taken at calendar year-ends. EPS represents profit after tax, minority interest, and preferred dividends, excluding extraordinary items prior to 1993 and including them after that year due to the implementation of FRS3. Firms with a negative value of GI and EPS in the base year are excluded. We used White's heteroskedasticity robust standard errors. All variables have been transformed by using natural logs, and observations above the 98. and below the 2 percentile for growth rates. MVE, RDSALES, BM and PASTR were eliminated. The *F* statistics and their *p*-values appear in the last column.

Sales, GI, and EPS regressions. The behavior of the MVE variable is not consistent across regressions: it has a negative sign for the EPS regression, positive for both sales and GI, but it is generally statistically significant only in the EPS regressions.⁶

More important, the coefficient for the R&D/Sales variable appears positive and significant at 5% in all regressions. This fact is in accordance with the relevant results from the $t, t+1$ time-window regressions, with the exception of the EPS regressions where the R&D/Sales coefficient is not statistically significant. Replacing R&D/Sales with R&D/TA (data does not appear on the table), causes no changes in the results in Table 6. However, the coefficients for R&D/TA are slightly lower than the ones for R&D/Sales, and the same applies to the values of the t -statistics. This shows that R&D intensity, even after having controlled for other variables, remains an important determinant for growth in future Sales, GI, and EPS, as was found by Chan et al. (2003) for the U.S. market. As already explained, this evidence constitutes a replication of prior evidence found for the United States within the United Kingdom in the process-operating growth and stock-return *persistence*. Still, it represents the first evidence on a positive association of R&D and subsequent operating performance for the United Kingdom. The R&D-intensity variable appears to have no impact on short-term EPS growth only. The results are robust to the addition of industry dummy variables, time-period effects and fixed/random effect estimation.⁷ We finally observe that the adjusted R-squares get very small values, with percentages below 5%

⁶ A possible limitation of the regression is that when we employ growth rates over the next 2 to 5 years as the dependent variable, a number of companies are lost as we move on to future years. In order to adjust for sample-selection bias arising from this survivorship issue, we have repeated the analysis by using Heckman's two-step selection – correction estimation, as described in Heckman (1979) and Greene (1981). In these cases, before running the actual regressions, we estimate a probit model with panel data in order to estimate the likelihood of a company being included in the sample survivors for the next 2 to 5 years. $\text{Selection} = \alpha_0 + \alpha_1 \text{SP} + \alpha_2 \text{PASTSA} + \varepsilon_{it}$, where *Selection* equals one if we have an observation for Sales or GI or EPS growth for the next 2 to 5 years, depending on the regression, and zero otherwise. *SP* equals the sales-to-price ratio at the end of year t and *PASTSA* equals the sales growth over the 2 years prior to year t (geometric mean). In a second stage, we ran Eq. (1) with panel data by adding an extra regressor $\beta'z$, where z is the Heckman correction, included as a control and obtained from the first step. We observed no qualitative changes in the direction of the results by using the Heckman two-step selection model, which was extensively presented in a previous version of the paper, especially regarding the sign and significance of the R&D-intensity variable.

Robustness checks include the addition of industry dummy variables (simple and multiplicative with R&D) for four industries that are perceived to be as intensive in R&D activity: Information Technology, Chemicals, General Industries and Health grouped together with Pharmaceuticals and Biotechnology. In order to control for time-period effects, we repeated the regressions in Table 6 by excluding the New Economy base years from 1998 to 2001, also run the regressions for the whole sample period by including a time-period dummy to account for the years 1998–2001 and 1999–2001, and found no qualitative difference in the direction of the results (untabulated data). We also used year dummies for all regressions, again with no qualitative change in the direction of the results, especially regarding the R&D-intensity variable. We also repeated the analysis in Table 6 by using averages of the BM, MV, and R&D/Sales or R&D/TA variables, and the R&D-intensity variable was found to be a positive and statistically significant in every single regression (untabulated data). The results on the significance of the R&D intensity variable were strongest under this estimation scenario. Finally, we repeated the analysis for the $t, t+2$ to $t, t+5$ time windows by using static BM, MV, and R&D/Sales or R&D/TA variables as of the base year, along with the Heckman modification, again with no great qualitative changes in the direction of the results (untabulated data). In the case of the EPS regressions, given the accounting changes imposed by the implementation of FRS3 for accounting years ending on or after the 22nd of June 1993, we repeated the EPS regressions only for the period 1994–2002 with no great qualitative change in the direction or significance of the results. Robustness checks finally include running the regressions for the $t, t+1$ time window with time-period fixed and random effects, with no qualitative change in the direction of the results.

in every case. This finding is in accordance with the relevant values in the results by Chan et al. (2003), and underlines the low predictability of growth. The results on the significance of the R&D-intensity variable are robust when using completely static regressors for all time windows, and also when using the Heckman (1979) two-step selection model to account for survivorship biases (untabulated results) so we do view possible survivorship bias problems to be influencing the direction of our results qualitatively.

The overall findings on the relation between R&D and consistency in subsequent operating-performance growth, indicate that, after controlling for firm size and the book-to-market factors, there appears to be a positive relation between R&D and consistent growth, but only in the cases when a firm needs to take on R&D activity as a result of the nature of its operations. On average, an R&D-intensive firm does not show more persistent growth compared to a non-R&D firm. When one compares firms that engage in R&D based on their industry sector, R&D intensity seems to play a role in persistence. This finding applies to measures of operating performance that we find in the higher steps of the income statement: e.g., Sales and GI, since the evidence that R&D plays any role for persistent growth in EPS for R&D-intensive industries is actually weaker and exists only when imputed growth rates are used in when EPS for a base year is negative. Finally, judging from the results about the significance of the R&D-intensity variable in the sales, GI and EPS regressions, after controlling for other factors, R&D intensity is strongly linked to future growth in sales and GI, and particularly long-term EPS.

4. Persistence in stock returns

4.1. Calculating risk-adjusted returns

To assess long-term stock market performance we calculate cumulative risk-adjusted abnormal returns (CARs) calculated using reference portfolios, similar in terms of firm size (MVE) and value (BM). Sample firms are divided into two size portfolios, using the median MVE as of the end of June in each year t . Then the firms in each of the two portfolios are divided into three BM portfolios: one containing the lower 30% of values for BM, another with the middle 40%, and finally, a portfolio containing the top 30% of BM ratios. The BM ratio is calculated using the book value at the end of the accounting year $t - 1$ and the MVE at the end of December of $t - 1$. In order to allow for financial data to be made public, the first month for which returns are calculated is July at year t . This results in six size-value portfolios, for which the breakpoints are rebalanced every year. The abnormal return for a firm for a specific month equals its return for the month, minus the equal-weighted return of the corresponding size-value reference portfolio for the specific month. Total returns, which include dividends, are used.

We then calculate *cumulative abnormal returns* (CAR) for each firm and for the reference portfolios for a particular time window and compute the abnormal return for a firm as the difference of these two values. Table 7 shows the average equal-weighted CARs over the next 1 to 5 years from each base year for the whole sample, then for the R&D versus the zero-R&D firms and, finally, according to R&D-intensity quartiles, expressing R&D intensity as R&D/TA, R&D/Sales and R&D/MVE. The values of the t - t statistics of the returns in brackets below the returns are also reported. Zero-R&D firms exhibit slightly lower returns compared to R&D firms over the five-year window (−2.4% versus 0.4%), which are not statistically

Table 7

Average, equally weighted, cumulative abnormal returns (risk-adjusted) for the whole sample, R&D, zero R&D firms, and according to R&D intensity

	1	2	3	4	5
<i>CAR</i>					
Sample	0.1 (0.132)	-0.1 (-0.260)	-0.3 (-0.450)	-1.3 (-1.687)	-2.0 (-1.760)
R&D firms	1.2 (1.455)	1.1 (0.865)	1.5 (0.948)	1.0 (0.763)	-0.4 (-0.296)
Zero-R&D firms	-0.4 (-0.673)	-0.6 (-0.876)	1.1 (-1.130)	-2.3 (-2.479)	-2.8 (-1.913)
<i>CAR R&D/TA</i>					
Low	-0.6 (-0.718) -4.2 (-0.882) 4.4 (2.996)	-2.4 (-1.690) -8.4 (-4.664) 4.4 (2.111)	-5.0 (-2.553) -10.5 (-4.456) 4.0 (1.349)	-7.4 (-2.758) -14.2 (-4.263) 0.3 (-0.884)	-12.4 (-4.236) -17.4 (-4.676) -4.6 (-1.393)
High	6.4 (3.205)	13.8 (4.658)	20.6 (6.142)	29.8 (7.964)	37.8 (8.045)
<i>R&D/Sales</i>					
Low	-1.5 (-1.615) -1.0 (-0.993) 3.2 (2.003)	-3.8 (-2.581) -3.8 (-2.245) 3.2 (1.589)	-5.5 (-2.822) -5.2 (-0.083) 1.3 (0.342)	-10.0 (-4.464) -6.4 (-1.497) -3.1 (-1.286)	-17.0 (-5.592) -8.1 (-2.149) -5.4 (-1.568)
High	4.6 (2.440)	10.8 (3.636)	17.1 (5.086)	27.0 (7.410)	32.3 (7.013)
<i>R&D/MV</i>					
Low	-2.0 (-1.958) -4.0 (-3.411) 1.9 (1.271)	-4.9 (-3.115) -5.9 (-3.231) 1.0 (0.300)	-5.4 (-2.923) -7.9 (-3.239) 1.5 (0.368)	-6.8 (-2.191) -10.7 (-3.571) -1.8 (-1.052)	-8.8 (-3.074) -16.9 (-4.553) -1.9 (-0.607)
High	10.1 (5.133)	17.6 (5.958)	21.5 (5.963)	28.8 (7.473)	31.9 (6.629)

The table reports the average, equally weighted, cumulative abnormal returns (CAR) for the next 1 to 5 years for the whole sample, R&D firms, zero-R&D firms, and R&D firms divided into R&D-intensity quartiles, according to R&D Total Assets (TA), R&D Sales and R&D market value-of-equity (MVE taken a calendar year-ends). CAR have been calculated with respect to the monthly equal-weighted returns of six annually rebalanced market-value-of-equity/book-to-market (MVE/BM) portfolios. These portfolios are created by dividing sample firms into two size portfolios using the median MVE as of the end of June in each year t . Then the firms in each of the two portfolios are divided into three BM portfolios: one with the lower 30% of values for BM, another one with the middle 40%, and one with the top 30% of BM ratios. The BM ratio is calculated using the book value at the end of the accounting year $t-1$ and the MVE at the end of December of $t-1$. In order to allow for financial data to be made public, the first month for which returns are calculated is July at year t . This results in six size-value portfolios, for which the breakpoints are calculated every year. We also report the values of the t -statistics of the returns in brackets below the returns.

significant at the 5% significance level. When calculating returns among R&D firms only, returns increase with R&D intensity, whatever the proxy for R&D intensity used, with cumulative returns of above 30% for the top R&D-intensity portfolio in terms of R&D/TA, R&D/MVE and R&D/Sales, following steady increases every year. The returns for the top R&D-intensity portfolios are highly significant statistically, which is not always the case for the returns of lower-intensity portfolios in the sample, including R&D firms and zero-R&D firms in general.⁸ Overall, before examining persistence in returns resulting from R&D investments, the results on Table 7 indicate that consistent with prior literature findings, high R&D firms exhibit abnormal excess returns which are also statistically significant.

4.2. Persistence in stock returns

Persistence in stock returns is defined as achieving *excess cumulative stock returns* (risk-adjusted) above the median excess CAR (risk-adjusted) of the overall sample, for up to 5 years beyond each base year. This measure of persistence is comparative, assessing persistence with respect to the performance of other firms in the sample.

CARs are calculated on a yearly basis, using monthly data from July at year t until June at $t+1$, July at $t+1$ until June at $t+2$, and finally July at $t+4$ until June at $t+5$ for the five-year window. We then measure how many times (for x years up to 5 years ahead from the base year), a company in the overall sample can achieve an excess return above the median yearly excess CAR. The number of firms with returns above the median is then divided by the total number of firms that show returns in the 5 years. We then calculate the average number of firms with returns above the median, the average number of firms with returns, and finally, the average percentage of firms with returns above the median return, which is the figure reported in our tables. Median CARs are calculated using all the available firm observational data in a particular year, from July until next June. If a firm delists during that period, data from the last month for which there is a return, is retained. The excess, risk-adjusted CARs of the sample firms, and subsequently the median excess risk-adjusted CAR for the overall sample, used as reference returns in defining persistence in market performance, have been calculated with reference to the monthly equal-weighted returns of six MVE BM portfolios.⁹

Table 8 shows the average percentage of risk-adjusted CARs above the median, for the whole sample, the R&D firms, zero-R&D firms, and R&D firms with R&D firms divided into R&D-intensity quartiles according to R&D/TA, R&D/Sales and R&D/MVE. On average, 4.1% of the sample firms can achieve an excess CAR above the median CAR of the

⁸ When we switch from equal-weighted to value-weighted returns (rebalancing the value weights on a monthly or a yearly basis – untabulated data), R&D firms outperform the whole sample, including zero-R&D firms. Excess returns in this case too, are higher for the top R&D-intensity portfolios, whatever the proxy used for R&D intensity. In addition, when we calculate excess returns with respect to the *value*-weighted returns of the reference portfolios, we observe no qualitative change in the direction of the results, nor do we when we replace CARs with abnormal buy-and-hold returns (results for BAHRs were included in a previous version of the paper).

⁹ We also calculated the persistence results using risk-adjusted CARs calculated with respect to the *value*-weighted returns of the six annually rebalanced MVE BM portfolios, with no qualitative differences in the direction of the results (untabulated data). Finally, we calculated the persistence results using risk-adjusted buy-and-hold excess returns, calculated with reference either to the equal or value-weighted returns of the reference portfolios, again with no qualitative difference in the direction of the results (results for BAHRs were included in a previous version of the paper).

Table 5

Persistence in returns for the sample, R&D, zero-R&D and R&D firms according to R&D intensity

	1	2	3	4	5
<i>CAR</i>					
Sample	50.0	26.4	14.1	7.7	4.1
R&D firms	50.8	26.1	13.6	6.9	3.3
Zero-R&D firms	49.7	26.7	14.4	8.1	4.5
<i>CAR R&D/TA</i>					
Low	48.5	22.0	9.7	4.6	1.7
	46.8	22.4	11.0	5.3	1.8
	53.7	28.6	15.2	7.8	4.4
High	55.3	33.2	19.7	11.4	6.5
<i>R&D/Sales</i>					
Low	48.2	23.6	10.4	5.2	1.9
	48.3	22.2	11.6	5.2	2.5
	52.0	26.2	13.1	6.9	3.7
High	55.2	33.5	20.0	11.3	6.1
<i>R&D/MV</i>					
Low	46.6	21.2	9.2	4.1	1.7
	48.1	24.6	12.9	6.7	2.9
	52.9	26.3	14.2	6.6	3.5
High	56.8	33.8	19.2	11.3	6.2

The table shows the average % of firms with risk-adjusted returns (Cumulative abnormal returns-CAR) above the sample median for the next 1 to 5 years for the whole sample, the R&D firms, zero-R&D firms, and R&D firms divided into R&D-intensity quartiles according to R&D Total Assets (TA), R&D Sales and R&D market-value-of-equity (MVE) as at calendar year ends (from low to high). CAR are calculated on a yearly basis, using monthly data from July at year t until June at $t+1$, July at $t+1$ until June at $t+2$, and finally July at $t+4$ until June at $t+5$ for the five-year window. CAR are calculated with respect to the monthly equal-weighted returns of six market value-of-equity book-to-market (MVE/BM) annually rebalanced reference portfolios, calculated as follows. We first divide the sample firms into two size portfolios, using the median MVE as of the end of June in each year t . Then the firms in each of the two portfolios are divided into three BM portfolios: one with the lower 30% of values for BM, another one with the middle 40%, and one with the top 30% of BM ratios. The BM ratio is calculated using the book value at the end of the accounting year $t-1$ and the MVE at the end of December of $t-1$. In order to allow for financial data to be made public, the first month for which returns are calculated is July at year t . This results in six size-value portfolios, for which the breakpoints are rebalanced every year.

sample, 5 years after portfolio formation. As in the case for operating-performance persistence, the zero-R&D firms are the ones that exhibit higher persistence in returns, compared to the R&D firms, with 4.5% versus 3.3% of firms achieving returns above median after 5 years. When persistence is assessed after dividing the R&D firms into quartiles according to R&D intensity, using all of R&D Sales, R&D/TA, and R&D/MVE as proxies for R&D intensity, persistence generally improves as R&D intensity increases. Most interestingly, no matter whether R&D Sales, R&D TA, or R&D/MVE is used as a proxy for R&D intensity, the firms with highest intensity R&D portfolios exhibit by far the highest percentages of returns above the median, and thus show the highest consistency in CARs compared to the zero-R&D firms. The two higher R&D-intensity quartiles steadily outperform the lower intensity quartiles, in terms of persistence in returns, with around 6%

of firms achieving excess returns above the sample median for five consecutive years after portfolio formation, following strong persistence in the previous years before reaching the five-year horizon.

The finding just mentioned is consistent with the previous observation that the top high-intensity R&D firms exhibit the highest cumulative abnormal returns. In this case, though, we go one step further and find that these firms can earn consistently higher risk-adjusted excess returns than the sample median, for up to five consecutive years, compared to the zero-R&D firms. The empirical evidence that firms with very high R&D intensity can earn superior returns also holds in terms of performance persistence: *R&D firms can earn higher risk-adjusted excess returns for 1 year after another.*

Finally, to account for the possible interaction amongst variables that may have an impact on market performance, we have regressed 12 month, risk-adjusted CARs, from July of year t until June of year $t + 1$, on R&D MVE and four industry dummy variables that represent R&D-intensive industries. These are Information Technology, Chemicals, General Industries, and Health grouped together with Pharmaceuticals and Biotechnology (untabulated data). Our regression results indicate that the R&D-intensity ratio is both economically and statistically significant for cumulative abnormal returns. The coefficients for the industry dummy variables get negative signs in every case, apart from the coefficient for IT. With the exception of the Chemicals industry, for which the dummy variable is statistically significant at 5%, the other three industry dummy variables are generally not statistically significant at any reasonable level of significance. Overall, the inclusion of the four dummy variables in the regression (both simple as well as multiplicative with R&D untabulated data), does not cause qualitative changes in the statistical and economical significance of the R&D-intensity variable.¹⁰

To summarize, we find a positive relation between R&D intensity and subsequent risk-adjusted excess stock returns. Extending prior literature in the field, we take the finding on the relationship between R&D and subsequent stock returns one step further and show that high R&D intensity also improves persistence in stock returns, expressed as being able to achieve returns above the median excess return of the sample, for a consecutive number of years: the highest R&D-intensity firms are found to be earning consistently higher risk-adjusted excess returns than the sample median, compared to lower R&D intensity, as well as zero-R&D firms. This constitutes evidence on persistent excess returns for high R&D firms for 1 year after another.

The main research question of this paper is not to identify whether R&D-related market performance is a result of market compensation for risk or market mispricing as argued in previous literature in an attempt to justify the empirically testified positive relationship between R&D and subsequent market performance. However, in order to be consistent with prior literature, this study adjusted stock returns for risk arising from differences in firm size

¹⁰ The regression described at this point was included in a previous version of the paper. As a final robustness check, in order to control for time-period biases, we also repeated the analysis by excluding the New Economy base years from 1998 to 2000, and ran the regressions for the whole sample period by including a time-period dummy to account for the years 1998–2000, with no qualitative difference in the direction of the results. In addition, we used year dummies, again with no qualitative change in the direction of the results, especially regarding the significance of the R&D-intensity variable. The results are also robust to replacing R&D MVE with R&D/TA as a proxy for R&D intensity.

and the book-to-market factor. Having performed this adjustment, persistent excess returns for R&D-intensive firms in the years following the initial R&D investments are still observed. These excess returns should not in theory exist after risk adjustment in an efficient market. Therefore, we interpret the evidence as consistent with *at least some* form of market mispricing. The fact that the found relationship between R&D and persistence in market performance is observed at the sample level independent of industry factors, when the positive association between R&D and persistent operating growth was only observed at the industry level, gives further weight to the mispricing interpretation. In other words, the pattern of behavior of market-performance persistence appears to be somehow not connected to the one of operating-growth persistence, which in turn contributes to our interpretation of the results — that they indicate *at least some* form of market mispricing.

5. Conclusions

In this study, we extend prior U.S. and U.K. evidence that suggest that R&D investment is positively related to operating and/or market performance by further examining the sustainability or persistence of operating growth and market performance as a result of R&D investments. Chan et al. (2003) find indirect evidence which suggest that R&D intensity is linked to *persistence* in operating performance, but they do not examine directly the association between R&D and persistent growth. First we first expand prior research on R&D and operating performance by assessing the persistence in corporate growth as a result of R&D investments. We argue that the possibility for a positive link between R&D and operating-performance persistence may provide insight into the quality of R&D undertaken by firms to the users of financial statements, and we predict a positive relation between R&D intensity and persistent operating growth resulting from the economic characteristics of the intangible investments of R&D. In order to testify whether possible evidence on persistence in operating growth provides clarifications to investors on the economic consequences of R&D investment for firm performance, we additionally expand prior research on R&D and market valuation by also examining *persistence* in stock returns as a result of high R&D. Putting aside the persistence issue for a moment, the paper also represents the first attempt to assess R&D and operating performance in general for the U.K. market.

We use a sample of all U.K. listed nonfinancial firms for the period 1990–2003 and we first show that R&D appears to be associated with improvement in persistence in operating growth but only among firms that engage in R&D because of the sector they belong to. This finding, that R&D intensity appears to relate positively to operating-growth persistence within R&D-intensive sectors, constitutes the first evidence of a direct relationship between R&D intensity and persistence in growth. At the same time, consistent with prior U.S. evidence, we document for the first time for the United Kingdom a positive and significant relation between R&D intensity and future growth in Sales, GI, and EPS after controlling for a number of other relevant factors including industry effects.

Second, consistent with prior evidence for the United States as well as the United Kingdom, we observe for our sample a positive relation between R&D intensity and subsequent risk-adjusted excess stock returns among firms that engage in R&D. At this point we extend prior evidence by finding that R&D intensity improves persistence in excess stock returns: we show that the highest R&D-intensity firms consistently earn higher

risk-adjusted excess returns than the sample median return, compared to lower R&D intensity, as well as zero-R&D firms. This finding represents the first direct evidence that R&D is positively associated with *persistent* excess stock market returns, for 1 year after another, for a consecutive number of years, after controlling for risk differences among firms arising from firm size and the book-to-market factor.

Overall, we find evidence of a positive association between R&D and subsequent persistence in operating growth only after taking the industry sector into account. In the case of market performance, we find that R&D intensity plays a role for persistent excess stock returns across the sample, which does not appear to be industry-specific. These two findings indicate a non-uniform behavior of operating as opposed to market-performance consistence as a result of R&D. At the same time, having made use of stock returns adjusted for risk arising from differences in firm size and the book-to-market factor, persistent excess returns for R&D-intensive firms for a number of years after R&D investments are still observed, which should in theory not exist in an efficient market. We, therefore, interpret the weight of this evidence as consistent with some form of mispricing related to inefficient market adjustment to the slowly emerging evidence of significant enhancement in operating performance following recent R&D investment.

A limitation that exists in construction of this type of study has to do with the existence of possible survivorship biases: when assessing persistence in growth or stock returns for the next 1 to 5 years, only the firms that survive during this time period are taken into account and, given that they survive, these firms could be more successful. By including the growth rates and returns of the surviving firms, we could be including the rates and returns of the more successful firms, and, thus, the growth rates and returns could be biased upwards. This problem is also recognized by Chan et al. (2003) as a limitation of their study on persistent growth. This problem, although recognized appears to be self-built in studies on persistent performance, and, therefore, the study is undertaken despite recognize a limitation it contains by construction.

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Book Review Section

The book review section is interested in works published in any language, as long as they are comparative or international in character. The author or publisher of such works should furnish the book review editor with two (2) copies of the work, including information about its price and the address where readers may write for copies. Reviews will be assigned by the book review editor. No unsolicited reviews will be accepted. Suggestions of works that might be reviewed are welcomed.

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Book reviews

Corporate Governance and Sustainability: Challenges for Theory and Practice, Suzanne Benn, Dexter Dunphy (Eds.), Routledge, Abingdon, UK, New York, USA (2007), xvii + 259 pages, £21.95, \$39.95, €29.54, ISBN 13:978-0-415-38063-8, 10:0-415-38063-4

The purpose of this collection of previously unpublished essays is to develop the thesis that corporate governance, as well as governance at other levels, should be restructured to promote sustainability. The volume addresses the theoretical and practical implications of the social and environmental degradation caused by economic activity for the governance of modern corporations.

The essays draw on the disciplines of organization studies, sociology, law, and political science. Readers trained in accounting, economics, finance, engineering, and/or the physical biological sciences may struggle with some of the terminology. However, cross-fertilization of thinking is particularly important in the areas of corporate governance and sustainability and readers from most fields will benefit from the collection. The book should be most beneficial to scholars, graduate students, and policy makers. Corporate executives and undergraduate students may not take the time to parse, or have the patience for, the academic presentation in this collection, but the concepts have broad relevance. A person could read one or two of the essays without reading the entire collection, but the volume is designed to be read as an integrated whole for maximum benefit. The editors refer to the individual essays as chapters, which indicates that they view the collection as a single work.

The eleven essays are grouped into three sections. Part I consists of two essays that provide a conceptual introduction to the topics of governance and sustainability. Part II contains four essays that describe the nature and limitations of existing models of corporate governance. Part III comprises two corporate case studies that illustrate the implementation of sustainability principles, and three essays on redesigning corporate governance for sustainability. The volume is well organized and includes a helpful introduction by the editors. Each essay is clearly written and itself begins with a substantive introduction. The editors, Benn and Dunphy, wrote four of the pieces in the volume and were obviously engaged in the development of the entire collection, which supports the central theme.

Benn and Dunphy wrote the first essay in Part I, an essay which provides a discussion of relevant concepts from political theory and management theory. The authors argue that traditional hierarchical organizations based on top-down authority must be replaced by adaptive and flexible systems of governance for both corporations and government. Emphasis should be placed on long-termism rather than short-termism, and interdependence and mutuality rather than organizational competition.

The second essay in Part I by Russell, Haigh, and Griffiths suggests that individuals in different organizations and industries have different understandings of sustainability. The researchers conducted a series of one-on-one interviews to investigate how people understand corporate sustainability.

The essays in Part II of the collection take issue with what the authors perceive to be the dominant model of governance, which is rooted in economic liberalism, market fundamentalism, and agency theory. The essays see economic liberalism as limiting corporations' ability to address sustainability. Wheeler and Davis, in the first piece in Part II, argue for a sustainable resource-stewardship model for corporate governance. A large portion of their essay addresses an empirical analysis of the correlation between various measures of the corporate governance and the market capitalization of some of the companies listed on the Toronto Stock Exchange. The authors interpret the empirical evidence both as an argument against governance scores being guides to the future market value of the shareholders' position and as support of their view of corporate governance practice.

In the second essay of Part II, Benn, Dunphy, and Griffiths suggest that corporate sustainability is promoted by a concept known as total responsibility management, an internal governance system that consists of a set of values-based and interdependent managerial practices that incorporate social responsibility and sustainability. The authors discuss three cases that illustrate the type of governance systems they advocate. At the heart of these systems is the need for significant changes in pluralist democratic political systems and social structure.

In the third essay of Part II, Martin, Benn, and Dunphy describe a case study of an Australian community-based organization designed to address environmental damage to land. The central point of this essay is that governance for sustainability must concentrate more on change and on the acquisition of new knowledge through innovation, reconciliation, creativity, and adaptability.

Readers with backgrounds and interests in finance and economics should find the fourth essay in this section particularly relevant. In this piece, Richardson, a lawyer by training, explains the role of financial markets in corporate environmental performance. He argues that financial markets are significant because they serve as conduits for funding, which influences the scale, timing, and nature of corporate and governmental investment. Financial institutions also have influence through their ownership positions in corporations and seats on boards. Richardson adds that the unique legal, informational, market, and institutional characteristics of financial markets limit the role of finance in environmental performance—characteristics like global transnational financial markets, fiduciary obligations of managers, and legal barriers to shareholder activism. Richardson rejects command regulation as a solution and recommends a reflexive approach to environmental regulation. Such an approach encourages reflection and self-correction by regulated agents, which moves the agents toward regulatory goals voluntarily. Tradeable emission allowances are an example of a reflexive environmental regulatory instrument.

Part III of the collection has a practical orientation, as the essays in it describe how sustainability is being implemented in various settings. In the first essay, Maxwell discusses the response of the board of Anglo American plc to corporate sustainability. Maxwell has

chosen a fascinating case because Anglo American plc is a large, old-economy mining company. The essay begins with a very helpful review of the major paradigms of corporate governance. Ultimately, Maxwell reports that Anglo American plc supports sustainability in some perhaps unexpected ways. Maxwell's final conclusion is that the role of corporate governance in sustainability is most effective if a holistic approach based on a multi-theoretic framework is implemented.

In the third essay, Benn, Wilson, and Low present an example of governance for sustainability at Insurance Australia Group (IAG), Australasia's largest general insurance company at the time. The essay offers the specific details of IAG's integration of sustainability into its corporate structure. IAG based its redesign on a balanced, value-based approach, tied to the principles of inspiration, integration, and innovation. This essay is an excellent complement to the piece on Anglo American plc. Together, the two essays provide the reader with a pragmatic view of redesigning an organization to promote sustainability.

In the second essay in Part III, Bondy, Matten, and Moon explore the role of corporate codes of conduct as vehicles for creating governance for sustainability. The authors provide a solid explanation of the nature and types of codes of conduct and specifically address the role of codes for sustainability in multi-national corporations. The authors reach the conclusion that codes are an incomplete and imperfect method for implementing sustainability in corporations, but that they are also valuable components of a governance system that encourages sustainability.

The fourth essay in Part III, which is by Bendell and Sharma, addresses the complex and thorny question of how to create and encourage desirable environmental and social performance from transnational corporations. The authors argue that "civil regulation" is the best approach for dealing with such corporations. This concept of "civil regulation" is modeled on the basis of a civil society where numerous groups, with different degrees of power, come together in a system of stakeholder democracy.

In the last essay of the book, Clarke provides a status report on the current state of corporate social responsibility. This essay is a nice summary with which to end the collection. Clark argues that a dynamic stakeholder model is moving modern corporations toward enlightened shareholder value. As a result, there is a good possibility that corporate governance can be redesigned to address sustainability.

The editors say their goal for the collection is to "stimulate your thinking and lead you too to contribute to this crucially important debate" (p. 5). I believe that they have accomplished this goal and that the book will lead others to think seriously about the role of corporate governance in sustainability. Some of the essays may be provocative to some readers. However, this is a good thing, in my opinion, because it will encourage more debate and discussion. I strongly agree that the topic is critically important to all people. Much work remains to be done on this topic, but this volume is an excellent start.

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Globalization of Accounting Standards, Jayne M. Godfrey and Keryn Chalmers (Eds.), Monash Studies in Global Movements, Monash University, Edward Elgar, Cheltenham, UK (2007), xvi + 309 pages, £69.95, US\$125.00, ISBN: 978-1-84542-852-5

As more than a hundred countries have adopted International Financial Reporting Standards (IFRS), the demand for publications on country-specific practical experiences, challenges, and accomplishments in implementing IFRS, as well as on the future prospects of global accounting convergence, is growing at an exponential rate. Because accounting is a very dynamic discipline, it must be studied from a historical perspective to be understood. Such a perspective examines how accounting practices around the world have been evolving toward a single set of high quality, understandable, and enforceable global accounting standards.

Globalization of Accounting Standards, one such effort, is well organized and easy to read. It offers an international perspective and can be used in undergraduate and graduate accounting courses. In addition to accounting academics and students, though, the book should be of great interest to a wide audience, including standard setters, economic regulators, preparers of financial statements, and political economists and strategists, because every country around the world is – in some way – moving toward IFRS. In his foreword, Sir David Tweedie, Chairman of the International Accounting Standards Board (IASB), commends this book to all readers seeking insights into the depth and breadth of issues relating to the globalization of accounting standards.

The aim of the book is to examine the key issues and implications of a global accounting convergence from the perspectives of a diverse range of worldwide stakeholders from various geographical regions, as perceived by the book's authors. Contributors analyze why countries decide to concede their national sovereignty over accounting standards. The book explores the different approaches to accounting globalization that result from differences in economic, political, legal, social and religious environments; it also considers the broad implications of adopting IFRS, implications which are often unintended and not contemplated, which extend beyond mere reporting to economic, social, political, religious and cultural outcomes.

A major strength of the book is that it is the product of a truly international collaborative project and includes contributions by prominent professionals from around the globe, from both academia and national/international standard-setting backgrounds, providing exposure to both of these perspectives. In addition, the book, which is divided into 16 chapters, offers insights regarding international and national approaches in pursuing accounting globalization through chapters focusing on the efforts made by the IASB and its predecessor IASC (International Accounting Standards Committee); by the G4 + 1 Group countries (Australia, New Zealand, Canada, the U.K. and the U.S.); by certain continental European countries (Italy, France and Germany) and by China, Japan and India. It also relates experiences from Malaysia and South Africa.

The introductory chapter by Jane M. Godfrey and Keryn Chalmers sets forth the book's purpose: to explain national approaches to accounting globalization and the common themes and key issues that have emerged in the movement towards global accounting standards. Common themes include the role of financial reporting, catalysts for the globalization of accounting standards, and national approaches to globalization. Key issues relating to the implementation of global standards include the principles-versus-rules debate, interpretative

issues, and the adequacy of IAS GAAP knowledge. In chapter 2, Gordon L. Clark, Tessa Hebb, and Dariusz Wójcik discuss the role of accounting information in the rapidly integrated finance market and explain the inevitability of global accounting standards by analyzing global information economics and potential economic benefits.

In chapter 3, Kevin M. Stevenson provides some personal reflections on the challenges and progress made by the IASB in the process of creating a single set of global accounting standards. He clearly explains how the existence and influence of the IASB were the result of market demand for global accounting standards focused on user needs – and not on preparer, auditor, or regulatory convenience. Because one of IASB's subtler, but most important, strategies has been to accentuate principles and not rules, Stevenson stresses the importance of the development of a new conceptual framework, which is a key prerequisite for principles-based standards. He notes the need for a consistent interpretation and application of those standards, but acknowledges that pressure exerted by the IASB to have the market take charge of its own destiny when interpreting standards seems to have worked far better than anyone has realized, or would admit.

The next four chapters of the book are written by authors from G4+1 countries. In chapter 4, David Alexander compares the principles-based approach in setting accounting standards in the U.K. with the more rules-based approach in the U.S., and provides a controversial analysis of the influence of the U.K. standard setter in the development of IFRS. Under a principles-based approach, it would be necessary for all participants in financial reporting to accept some diversity in application as the implications of new standards are becoming fully understood. Chapter 5, by Donna L. Street, describes the evolution to a global focus in setting accounting standards in the U.S., beginning with the Financial Accounting Standards Board's (FASB) first strategic plan for international activities, formulated in 1991, and its subsequent influence on G4+1 activities. Today, the FASB is working jointly with the IASB and other national standard-setters on all new standards. Although the FASB's hopes in the late 1990s to become the worldwide standard setter have failed, its efforts did result in having the IASB impose the FASB-like "due process," with members of the IASB being selected based primarily on technical experience and devotion to the public interest, and not only on geographic representation, as recommended by the European Commission.

In chapter 6, James C. Gaa describes the tension between principles-based and rules-based approaches in accounting standard setting in Canada, the result of its cultural and historical ties to the U.K. and its geographical and economic ties to the U.S. A proposed plan for the convergence of Canadian standards with IFRS by 2011 is indicative of Canada's intent to pursue its own principles-based approach that requires significant professional judgment but adds sufficient rules to achieve the standard's objective. This chapter is followed one offering Ruth Picker's insights into Australia's early decision to adopt IFRS and the consequences of this decision for the profession and for enforcement in the business and finance communities. In developing A-IFRS (the Australian national equivalent to IFRS), the Australian Accounting Standards Board made certain changes to the content of IFRS, resulting in the potential for nonconformity, especially as related to not-for-profit entities. Picker analyzes the unexplored impacts of accounting globalization, including problems with consistent interpretation and application of IFRS in practice and possible alignment of IFRS with U.S. GAAP.

Chapters 8 through 11 are devoted to the issues and experiences of continental European countries. In chapter 8, Angelo Provasoli, Pietro Mazzola, and Lorenzo Pozza describe the accounting revolution taking place in Italy, following the adoption of IFRS. Traditionally, Italian accounting standards were government-driven, tax-dominated, and code-based, but today Italy is one of the few European countries that requires the adoption of IFRS by listed companies not only in consolidated accounts, but also in individual accounts. To accomplish this requirement and adoption, modifications to both the civil code and the fiscal code were needed.

Chapter 9, written by Serge Evraert and Jean-François des Robert, describes the recent evolution of the role of financial reporting in France, where the national approach to accounting is still based upon the Civil and Commercial Code and on the patrimonial nature of accounting. According to the authors, one of the main problems in implementing IFRS in France is its potential impact on tax reporting, as well as the issue of accounting standards for small and medium-sized entities (SMEs), entities which contribute 70% of the GNP in France and having a special need for simplification of financial reporting.

In chapter 10, Hans Peter Möller provides an analysis of the limitations of HGB accounting under German GAAP in relation to U.S. GAAP and IFRS accounting. This chapter demonstrates empirically that present HGB accounting is not necessarily as uninformative to investors as is generally thought, and it questions the superiority of IFRS or U.S. GAAP in providing information that is useful to German capital markets. From this and the previous two chapters, it is clear that accounting experts in the continental European countries would like a stronger voice on the IASB Board. The Italy–France–Germany sequence of chapters highlights the traditionally different role of financial reporting in these countries and demonstrates that the effects of globalizing accounting standards include and extend beyond capital markets.

In chapter 11, Keryn Chalmers, Jayne M. Godfrey, Ian Langfield-Smith, and Wei Lu examine the globalization of accounting standards for public sector entities in Australia and explore the role of financial reporting as a governance tool. The fact that A-IFRS is sector neutral and required for private as well as public sector entities makes Australian public sector entities among the first in the world to report under IFRS. This unique experience, with all its issues and challenges, should be of interest to all countries that might consider extending IFRS to public sector entities.

Chapters 12 through 14 focus on accounting developments in China, Japan, and India – countries that are committed to the global accounting convergence as a result of their increasing involvement in world trade, labor, and the capital markets. In chapter 12, Wei-Guo Zhang and De-Ming Lu describe the globalization of accounting standards in China. The major force driving the convergence of Chinese accounting standards with IFRS is a growing capital market. Despite China's positive approach to IFRS, however, the country is not rushing to adopt these standards and thereby concede its own sovereignty over standard setting.

Chapter 13, written by Chitoshi Koga and Gunnar Rimmel, considers the unique Japanese business system of keiretsu groups, a system which results in financial statements being used primarily to indicate the results of managerial stewardship based on company law. In 2005, Japan began working with IASB on the convergence of its standards in order to attract international debt and equity. The results of a survey distributed to senior financial managers of the largest Japanese firms regarding the potential costs and benefits of IFRS

adoption indicated skepticism about adopting IFRS, and whether the benefits of adoption can outweigh the costs.

In chapter 14, R. Narayanaswamy presents developments in Indian accounting in the context of the on-going globalization of the Indian economy. India is still in the early stages of its involvement in the globalization of accounting standards. The stock exchange and the securities regulator have played a significant role in influencing this process, as have labor market pressures and regulatory initiatives in response to overseas developments, such as the East Asian Crisis and the Sarbanes–Oxley Act.

The final two chapters propose that the benefits of globalizing accounting standards, usually asserted in terms of economic gains, are far reaching. Chapter 15, by Norita Mohd Nasir and Aniza Zamol, demonstrates that organizations and individuals in Islamic economies must adhere to Shariah requirements, which, for instance, strictly prohibit the use of interest in business dealings and mandate the component of earnings or expenditure to include permitted or prohibited items. Malaysia attempts to manage support for accounting globalization with support for accounting and auditing standards of Islamic financial institutions.

In chapter 16, Iain Edwards, Peter Schelluch, Adel Du Plessis, Jean Struweg, and Andrew West examine the globalization of accounting standards in South Africa. This process began in the mid-1990s as key element in the post-Apartheid government's political and economic reform program and has had a significant impact on education and on social and cultural life as well.

One of the key issues that emerges in this book is the evolution of the financial reporting environment toward global accounting standards, which are based more on "principles" rather than detailed "rules." This trend impacts how accounting standards are developed and applied and how accounting should be taught. Changes in the financial reporting environment are necessary for the proper application of these principles-based standards. Accountants must understand basic principles and objectives, as well as the economics and substance underlying a transaction or event, and apply professional judgment in relation to these principles and objectives. This approach will bolster the status of the accounting profession, because only professional accountants will have access to this body of knowledge.

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Corporate Governance Post Sarbanes -Oxley, Regulations, Requirements, and Integrated Processes, Zabihollah Rezaee, John Wiley & Sons, Inc., Hoboken, New Jersey, USA (2007), xvi + 544 pages, \$85.00, £34.99, €68.00, ISBN: 978-0-471-72318-9

In the wake of a number of high profile corporate scandals in recent years, the Securities and Exchange Commission (SEC) has turned a spotlight on the issue of corporate governance (hereafter CG). This book develops a framework for examining CG's various functions and introduces an integral approach for those functions, designed to create

sustainable shareholder value while protecting the interests of other stakeholders. The book's 14 chapters are grouped into three parts. Throughout the book, the author broadly defines CG as a company's relations with a wide range of CG participants, including the board of directors, management, auditors, legal counsel, financial advisors, regulators, standard setters, shareholders, and other stakeholders. The book emphasizes the CG regulations and requirements of the post-Sarbanes-Oxley Act (SOX) period. The book's audience is primarily practitioners.

Part I ("The Rise of Corporate Governance") contains two chapters. Chapter 1 discusses CG's role in improving investor confidence in corporate America. CG's role is fundamentally to minimize the agency problem and to ensure that management's interests are aligned with those of shareholders. The author maintains that CG reforms are necessary, mainly because the conventional belief that the market correction mechanism will ultimately yield the best CG practices is flawed. The flaw of this belief lies in the fact that by the time markets are able to make such a correction for ineffective CG, investor confidence has already been lost, along with a substantial amount of market capitalization.

Chapter 2 examines CG fundamentals. CG structure consists of three interrelated components: principles, functions and mechanisms. The chapter presents six CG principles released by the Organization for Economic Cooperation and Development. The author proposes honesty, resilience, responsiveness, and transparency as the best practices for improving companies' CG. The chapter also lists the organizations that provide CG rating services. In addition, the author identifies areas where the global convergence of CG is feasible and the major differences that make convergence more difficult.

Part II ("Functions of Corporate Governance"), which includes chapters 3 through 10, constitutes the heart of the book and integrates all of CG's major functions. Chapter 3 examines the oversight function assumed by the board of directors in holding management accountable for creating shareholder values. The author points out that while the ultimate responsibility for good CG rests with the board of directors, in facing the challenges of compliance in the post-SOX era, many boards still struggle to strategically advise management without micromanaging its decisions and actions.

CG's oversight function is typically delegated by the board of directors to various board committees. Chapter 4 discusses three primary board committees: the audit committee, the compensation committee, and the nominating governance committee. Because the functions of these committees adhere to CG's oversight function, the book's organization would have been better if chapter 4 had been incorporated into chapter 3.

Chapter 5 covers the CG's managerial function, namely managing, directing, and controlling corporate affairs. The responsibilities of the management team, including the CEO, CFO, and other senior executives, are presented, followed by a discussion of various executive compensation plans and the SEC's requirement about executive compensation disclosure. The author also provides a good discussion of both management responsibilities related to Section 404 of SOX, which regards management's assessment of internal control, and the challenges facing companies in their implementation of Section 404.

Chapter 6 presents CG's compliance function, which aims to ensure conformity with all applicable regulations, standards, procedures, and best practices. The chapter provides extensive coverage of the federal and state governing bodies and standard setters relating to

CG. SOX's primary provisions are also presented. In addition, the chapter lists a number of professional organizations that promote the best practices for effective CG.

Chapter 7 discusses CG's internal audit function that is typically assigned to internal auditors, which provides assurance services through an ongoing monitoring of CG, operations, and risk management. The author cites a number of studies to compare the trends of the internal audit function in the pre- and post-SOX eras. The internal auditors' role in internal control is also presented, followed by a discussion of the controversial issue of internal audit outsourcing.

Chapter 8 presents CG's advising function, namely providing legal and financial guidance to the board of directors and executives. The author identifies a number of key players involved in this function, including the legal counsel, financial and investment advisors, securities analysts, and investment banks. The ethical considerations of these players are also discussed.

Chapter 9 covers the external audit function assumed by external auditors. In the post-SOX era, the Public Company Accounting Oversight Board (PCAOB) regulates the auditing profession. The PCAOB initially adopted as its interim standards those AICPA Statements on Auditing Standards that existed on April 16, 2003. As of April 15, 2007, the PCAOB has issued four additional auditing standards. This chapter includes a detailed discussion of these standards, and also discusses both the audit committee's oversight of external auditors and the integrated audit approach.

Chapter 10 examines the monitoring function assumed by shareholders. The rights of shareholders are illustrated, followed by a discussion of ways to enhance shareholders' voting power. The author emphasizes institutional investors' important monitoring role, citing a recent study that reports how institutional investors exert most influence. The chapter also discusses the monitoring roles of mutual funds and hedge funds.

Part III ("Contemporary Issues in Corporate Governance") consists of chapters 11 through 14. Chapter 11 emphasizes CG in private and not-for-profit organizations, while chapter 12 discusses business ethics and its role in CG. Chapter 13 examines the relation between globalization, technology, and CG, while chapter 14 discusses future trends and emerging initiatives in CG.

Overall, this book provides a very good overview of CG's various aspects, emphasizing CG's seven functions. It contains a large number of citations from both academic and professional literature. The book serves well its primary audience, practitioners, by presenting comprehensive coverage of CG regulations, requirements and processes in the post-SOX era. The book's materials, however, could be better organized. Subjects within a number of chapters appear isolated from each other. For example, it is unclear why the sections of chapter 6 are presented in the particular order they are, and how those sections are interrelated. It is perhaps beneficial to the reader that at the beginning of each chapter, the author provides a short summary of the chapter's organization.

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Methodological Issues in Accounting Research: Theories and Methods, Zahirul Hoque (Ed.), Spiramus Press, London (UK) (2006), xix + 537 pages, £25.00, €38.00, \$45.00, ISBN: 1-904905-13-7 (paperback)

This edited collection, comprising 26 chapters, reviews and critically evaluates the applicability of existing theories and methods for studying accounting practices. Its focus management accounting and control systems. The book is organized into seven parts: positivistic perspectives, the naturalistic research approach, institutional and contextual perspectives, critical perspectives, research methods and data analysis, ethical issues, and publishing research. While methodological issues such as survey research and data reliability are discussed, the book's strength is its combination of traditional and emergent theories/paradigms into one collection, and its assessment of the applicability of those theories/paradigms to accounting research. The book is motivated by the fact that, though accounting researchers employ many different theories, the choice and application of those theories are seldom evaluated and compared in a single text. Overall, the authors have done a good job in filling this gap in the methodological literature. As a result, this book distinguishes itself from many others with a traditional focus on research method issues. I compliment the editor and authors on their efforts in producing this interesting book and recommend it for the permanent collection of any serious accounting researcher.

1. Introductory chapter

Chapter 1 provides a brief synopsis of each of the book's seven parts. It gives readers an overview of both the traditional and the emergent theories covered in the book.

2. Part I — positivistic perspectives

Chapters 2 through 7 review and evaluate several positivistic perspectives consistent with the traditional thinking underlying the scientific method. Chapter 2 introduces the rational choice theory (RCT) of decision making to provide insights into how and why actors make decisions based on the principle of optimization. It discusses bounded rationality, bureaucracy and the principal-agent relationship. Chapter 3 outlines the key features of human relations and illustrates how human relations theory can be applied to management accounting research. Because human factors influence both accounting policy making and implementation, a human relations perspective is important in enhancing our understanding of accounting in an organizational context.

Chapter 4 discusses contingency theory, which underlies a well-developed body of work within management accounting and control literature. The theory results from criticisms of classical optimization theories such as the bureaucracy theory outlined in chapter 2. The chapter focuses on the nature of "fit," a central theoretical concept in contingency theory, and discusses the major forms of fit adopted in the literature. The practical guidance that this chapter provides would be very useful to researchers interested in this area.

Chapter 5 offers an overview of agency theory (AT) and its application to management accounting research. The chapter discusses and compares three main AT-based research branches, namely the Principal-Agent, Transaction Cost Economics (TCE) and Positivist

(Rochester) models. It ends by reviewing some recent AT-based accounting studies and offering suggestions for future research. Chapter 6 deals further with TCE, reviews related, predictions and critics, and examines its influence on management accounting research.

Chapter 7 reviews the evolution of strategic thinking and Management Control Systems (MCS) literature. It discusses the various perspectives of strategy, the strategy-control interface, and some challenges for MCS development. The chapter concludes by suggesting a broad, flexible MCS framework to accommodate the disparate perspectives of strategy necessary in a competitive and knowledge-intensive environment.

3. Part II — naturalistic research approach

Chapter 8, the only chapter in Part II, introduces the naturalistic research approach. It responds to the criticism that traditional positivistic perspectives are based on oversimplified deductive reasoning by reviewing and advocating a naturalistic research approach in general, and the Ground Theory (GT) method in particular. Under the GT approach, theory should evolve from empirical evidence rather than developed a priori and then subsequently tested. The chapter discusses how this method can be applied to study complex accounting phenomena. Based on this discussion, the naturalistic approach seems more applicable to studies based on the emergent theoretical perspectives covered in the next two parts.

4. Part III — institutional and contextual perspectives

Part III consists of chapters 9 through 12. Chapter 9 offers a general introduction to legitimacy theory, which views "organizational legitimacy" as an important resource for organizational survival. The chapter reviews the application of this theory in empirical accounting research and discusses some limitations of the literature. Chapter 10 broadens chapter 9 to a wider setting by introducing institutional theory. It reviews the three branches of the theory that have the most influence on accounting research, namely old institutional economics, new institutional economics, and new institutional sociology. The chapter ends with a proposed research agenda for understanding accounting as an institutional practice.

Chapter 11 focuses on stakeholder theory as an alternative to the traditional shareholder approach in accounting studies. The chapter introduces the basic theoretical arguments and the different models of stakeholder theory, and then highlights how stakeholder perspectives affect accounting, performance reporting and organizational governance. The chapter also discusses specific accounting issues addressable under this theory.

Chapter 12 outlines recent attempts to understand management accounting systems within their organizational context. It surveys different streams of "alternative management accounting research" to interpret management accounting changes within an institutional framework.

5. Part IV — critical perspectives

Part IV moves away from traditional theories by focusing on critical perspectives. Chapters 13 and 14 discuss critical theory and labor process theory, both of which

originated from Marxist thought. Chapter 13 focuses on how critical theory can be applied in accounting research to provide insightful critiques of accounting practices with a view toward social betterment. Chapter 14 presents a brief overview of labor process theory, which considers accounting systems as both a medium and an outcome of class conflicts. It discusses contemporary criticisms of the theory and its applications in accounting. The chapter also offers directions for future research.

Chapter 15 introduces the Gandhian Vedic philosophy of living in harmony with nature as a counter to the dominant paradigm of living for economic growth, a philosophy based on the logic of control. The theory advocates the radical reform of personal perceptions, lifestyles and structural forces to promote sustainable development. While the chapter discusses some interesting philosophical ideas, it needs to offer further elaboration regarding how accounting researchers could apply the theory.

Chapter 16 addresses power and accounting from a critical perspective. It first presents a review of the power concept, with an emphasis on the various frameworks of power, and then discusses research on the power of accounting and power over accounting, at both the organizational and the institutional levels of analysis. The chapter also offers suggestions for future research.

6. Part V — research methods and data analysis

Part V, which focuses on narrowly defined method issues, resembles many other research methodology books presently available. Chapter 17 discusses the case study approach and briefly reviews some of the accounting studies that use the method. The chapter also explores action research, which is a type of case study approach.

Chapters 18 and 19 provide an introduction to qualitative research. While chapter 18 delivers practical guidelines, chapter 19 elaborates upon the foundation of protocol analysis and conducts a review of selected accounting studies employing protocol analysis.

Chapter 20 discusses the appropriate use of financial ratios in quantitative data analysis. It illustrates, in particular, the pitfalls of using financial ratios to measure firm performance when reported shareholder equity and/or earnings are negative.

Chapters 21 through 23 cover research methods commonly employed by management accounting and control system scholars. Chapter 21 first presents a reasonably detailed discussion of methodological procedures for survey research, and then provides a critical review of selected studies in management accounting using the survey method. Chapter 22 focuses on ways to establish and assess reliability and validity – including construct validity, internal validity, and external validity – in the area of field study research. Chapter 23 outlines triangulation approaches to accounting research, detailing specifically the triangulation concept, its various forms and its limitations.

7. Part VI — ethics issues

Chapters 24 and 25 address ethics in research. Chapter 24 reviews the basic ethical principles and requirements involved in human subject research, and offers some tips for applying for human ethics approval. It also provides some examples of good ethical

practices. Chapter 25 deals with some significant methodological issues pertaining to accounting ethics research, with a focus on discipline-based methodologies such as economics-based methods and psychological approaches.

8. Part VII — publishing research

The last chapter provides practical guidance and useful suggestions for publishing in academic accounting journals. It offers many comments and observations, as well as “dos” and “don’ts,” that should be particularly interesting to newcomers to accounting research.

9. Concluding remarks

On the whole, the book is a well-organized reference for new and seasoned researchers interested in management accounting and control systems research. Each chapter begins with an abstract and brief introduction, features that assist readers in quickly locating the main content. Similarly, each chapter ends with a short conclusion that helps readers to summarize what they have learned. All chapters include an extensive list of references to theories, methods, and accounting applications, a feature that usefully assists readers in further exploring a particular topical area. Although the book is predominately about research in management accounting and control systems, exposure to the theories and methods covered will benefit accounting researchers from all paradigms.

One suggestion for future improvement would be to include a synopsis before each of the book’s seven parts. Such a synopsis could provide an overview of why different theories methods are grouped together and a discussion of the differences and commonalities among them. For example, how is contingency theory related to and different from RCT? Furthermore, the synopses could discuss and elaborate the connections between different strands of theories paradigms wherever applicable. For example, what are the connections between traditional and emergent theories? Can both the scientific method and the naturalistic approach be applied together with institutional and contextual perspectives? Answers to these questions will help readers, especially research novices, appreciate the different strands of theories and methods better.

Finally, the introductory chapter of the book should recognize and discuss an important scope limitation. While the title of the book seems to suggest that it covers methodological issues for the entire span of accounting research, the book in fact deals almost exclusively with one particular area: management accounting and control systems. The book has almost completely ignored the mainstream capital-markets based financial accounting research that has, for the past 40 years, dominated the world’s top-tier accounting journals, such as *The Accounting Review*, *The Journal of Accounting and Economics*, *The Journal of Accounting Research* and *Contemporary Accounting Research*. Given the book’s size, it is probably not realistic to expand its coverage to include capital-markets based research, even though some of the theories reviewed such as AT and institutional economics are applicable and relevant. At the very least, however, the book should explicitly address this scope limitation and give readers a balanced view

of accounting research. Preferably, the title of the book should also be altered to reflect its scope.

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International Financial Management, Jeff Madura, Roland Fox. Thomson Learning, London (UK) (2007). xxii + 758 pages, £39.99, €60.57, ISBN: 978-1-84480-360-6

This textbook aims at an advanced undergraduate or master's level audience. The book covers a wide range of topics and is divided into five parts and 22 chapters. Part I provides an overview of the international financial environment. As the book focuses on the particular perspective of listed multinational corporations, Chapter 1 describes the important characteristics of multinational firms' risks, opportunities and business methods. Chapter 2 deals with the international flow of funds and the balance of payments. Chapter 3 presents an overview of foreign exchange markets and international financial markets in bonds, equities and short-term fixed income products. Chapter 4 sketches exchange rate determination, while Chapter 5 presents plain vanilla currency derivatives.

Part II of the book takes a closer look at exchange rate determination by analyzing the impact of governments and central banks on exchange rates and by presenting international parity conditions. Part III's focus is exchange rate risk management. Chapter 9 looks at exchange rate forecasting, while Chapter 10 addresses the still unresolved problem of measuring exchange rate exposure. Chapters 11 and 12 discuss the management of transaction, translation and economic exposure. Part IV of the book deals with the long-term investment and financing decisions of multinational corporations (e.g., foreign direct investment, multinational capital budgeting and restructuring, country risk analysis, cost of capital and capital structure). Part V addresses short-term asset and liability management such as international trade financing, short-term financing decisions and international cash management systems.

The textbook adheres to a modern pedagogical approach, in that each chapter starts with a clear statement of its objectives. Most chapters are followed by a range of self-test questions (answered in an appendix), applications, a mini-case and a critical debate section presenting two opposing views and asking the reader to form his/her own opinion. Students will appreciate this style as it involves the reader with the material far better than most other textbooks. Some basic analytical tools, including regression analysis, are relegated to an appendix. The book's website contains a glossary, a range of multiple-choice questions and various links for students, as well as presentation slides and teaching notes for lecturers.

Overall, this is a good textbook for a reader without technical or analytical ambitions. It presents the material in a way that is both informative, and stimulating, but is also strictly intuitive. Some more analytical material is banned from the main text and presented in

appendices. In general, the mix of main text, on the one hand, and examples, graphs, maps, web links and other content, on the other, is nicely balanced. In some chapters, however, the flow of the main text is interrupted by a number of examples that might be too large. The examples used in the European edition, reviewed here, often relate to U.K. or Continental European firms, rather than solely to U.S. firms; obviously, this focus derives from the fact that Roland Fox is at Salford University in England.

The sequence in which Madura and Fox present the material almost always follows the natural logic dictated by the material itself. Personally, I would prefer two changes: The material on political risk should not be presented more than 200 pages after the discussion of exchange rate determination, as political factors are still critical for exchange rate movements in a large number of countries. Also, hedging with options (Chapter 5) should not be presented before analyzing risk management in general (Chapters 10 through 12). I think it is preferable to deal with risk management first and then present foreign exchange derivatives as instruments for achieving risk management objectives.

The book is comprehensive in the sense that it covers the range of aspects and topics that seem to define the international standard in textbooks on this subject. Given the importance of international financial management and multinational corporations in a world economy that is integrated in a way that it never was before, it is not surprising that Madura and Fox's book has a number of well-established competitors such as the textbooks by Shapiro (2006) and Levich (2001). In relation to these competitors, Madura and Fox have opted for an even more intuitive way of presenting the material. For some topics, such as political risk, this presentation is an advantage. For others, such as international party relations, a slightly more analytically rigorous exposition might be preferable, even for an advanced undergraduate course. Madura and Fox present politically sensitive material – on corruption, expropriation, and other forms of government intervention – in a way that positively lacks the missionary undertone that some other authors can hardly avoid.

In my view, the main issue with almost all of these textbooks, including the one by Madura and Fox, is that they do not follow the logic of the "typical" finance textbook. At the risk of oversimplification, one might claim that "typical" finance textbooks start with frictionless markets, derive optimal decisions and characterize the resulting equilibria. They then proceed by introducing various types of frictions, and by analyzing optimal behaviour given these frictions. This logical structure provides the reader with a clear benchmark and guideline as to when and why certain behaviour is optimal given certain assumptions. Unlike the typical *finance* textbook, the "typical" *International Financial Management* textbook, again at the risk of oversimplification, does not normally start from frictionless markets, but rather provides a wide range of arguments based on market frictions of various kinds, without also providing related arguments that would apply in the benchmark case of frictionless markets. The prime example for the difference between these two types of approaches is the way risk management (for the international financial management text) and capital structure (as its counterpart in the finance text) are being presented: A finance textbook uses the Modigliani–Miller irrelevance results as a benchmark and then

¹ I am not aware of any other international finance textbook that follows this logic. The closest I am aware of is the slightly outdated textbook by Sercu and Uppal (1995). However, a new textbook, entitled *International Finance: Putting Theory to Practice* and written by Piet Sercu, is scheduled for publication in 2008 by Princeton University Press.

introduces market frictions in order to justify the existence of various types of optimal capital structure and financing instruments. The analogue in an international financial management textbook is risk management. Rather than clearly stating that risk management is redundant under the very same Modigliani–Miller assumptions and justifying hedging activities with violations of these assumptions, such a textbook usually gives the reader a variety of arguments without having a benchmark for comparison. In my view, it should be worth the effort to provide the reader with a clear benchmark before presenting the colorful world of international financial markets and institutions and all their frictions.

Notwithstanding this more general criticism, *International Financial Management* by Madura and Fox is an easily accessible, comprehensive textbook. It seems particularly suitable for an audience interested in covering a wide range of aspects in a more intuitive, non-technical way.

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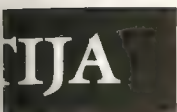
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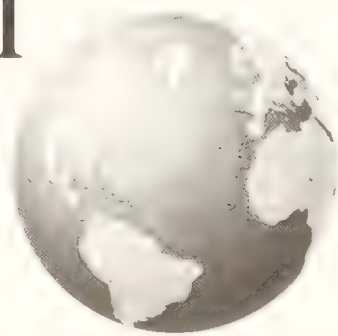


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Analyzing the German accounting triad — “Accounting Premium” for IAS/IFRS and U.S. GAAP vis-à-vis German GAAP?

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Abstract

This paper critically examines the impact of voluntary adoption of Internationally Accepted Accounting Principles (IAAP, i.e., IAS/IFRS and U.S. GAAP) on the cost of equity capital in Germany. We find that (1) overall cost of equity-capital estimates in the Capital Asset Pricing Model (CAPM) for companies applying IAAP are significantly lower compared to those applying German GAAP, (2) an enhanced multi-factor model which incorporates the accounting-regime differences (called “GM model”) absorbs the cost of equity-capital differences, and (3) changes of the institutional background in Germany and of the accounting standards lead to different cost of equity capital effects for subperiods of the 1998–2004 voluntary-adoption period, while particularly controlling for effects like self-selection, cross-listing, and New Market (*Neuer Markt*) listing.

A previous version of this paper was presented at the Illinois International Accounting Symposium held at University of Hawai‘i at Manoa, HI, in June 2007. We are grateful to the discussant Bill Cready and conference participants for their comments and suggestions. Moreover, we thankfully acknowledge helpful comments by an anonymous reviewer. We are also grateful to the participants of the Annual Congress of the European Accounting Association 2008 in Rotterdam, especially the discussant Ann Gaeremynck, for further comments and suggestions. Moreover, we thank the organizing committee of this conference for granting us the Best Paper Award in the category “International Financial Accounting” for this paper.

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The central thesis advanced in this paper is that changes in the accounting standards and the institutional infrastructure can influence the impact of applying IAAP. Therefore, we suggest incorporating an accounting factor into the cost of equity-capital analysis.

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JEL classification: M41; G12

Keywords: Accounting regime adoption; Cost of equity capital; Multi-factor model; IFRS; U.S. GAAP; Germany

1. Introduction

This paper critically examines the impact of the voluntary adoption of IAS/IFRS² and U.S. GAAP (in the following referred to as “Internationally Accepted Accounting Principles” (IAAP)) by German companies. The results suggest that for companies adopting IAAP an “accounting premium” is granted by investors, implying a lower cost of equity capital. Our results specifically hold when controlling for effects like self-selection, cross-listing, and New Market (*Neuer Markt*) listing. Based on these accounting anomalies we can develop a novel multi-factor model that captures the “accounting premium” and leads to an improvement of the CAPM and Fama–French model.

The paper contends that the adoption of IAAP could have direct and indirect effects on the cost of equity capital. The indirect effects via improving earnings quality or disclosure levels as well as lowering information asymmetry have been widely examined. However, the impacts and interrelations of these effects are difficult to separate. To capture direct effects, like additional costs or impact on brand recognition, a study must focus on the entire link between the adoption of IAAP and the cost of equity capital. Our study provides a comprehensive examination of the indirect and direct effects of this link on the cost of equity capital.

For the empirical analysis, we use both a portfolio-based and a firm-level analysis. For the portfolio view we apply a Capital Asset Pricing Model (CAPM) and an enhanced multi-factor model to include the information about the type of accounting regime applied as an additional factor. Even though Francis, LaFond, Olsson, and Schipper (2005), Ecker, Francis, Kim, Olsson, and Schipper (2006), and Barth, Konchitchki, and Landsman (2007) have worked with factor-mimicking portfolios and new information risk-related factors, to the authors’ knowledge, so far no study has assessed the impact of the type of accounting regime applied to an asset pricing model like the multi-factor analysis based on the Fama–French three factor model (Fama & French, 1993). Our combination of multi-factor regression and accounting-regime factors leads to a novel approach to studying the question of whether or not different accounting regimes justify empirically significant differences in excess returns in an asset pricing model. For the firm-level analysis we incorporate a two-stage estimation procedure in which we are able to address explicitly the issue of self-selection. Moreover, we control for cross-listing effects and New Market (*Neuer Markt*) membership.

² The International Financial Reporting Standards (IFRS) were initially called International Accounting Standards (IAS). In 2002, the name was changed International Financial Reporting Standards (IFRS). In general, we use a combination of both terms (“IAS/IFRS”). When we refer to a specific time period, we use the term “IAS” for years before (including) 2002 and the term “IFRS” afterwards.

This study examines the major objectives many German companies have for voluntarily adopting an IAAP. By substituting the domestic accounting regime and, therefore improving the transparency of financial reporting, German companies expect to lower the cost of equity capital. Our study tests this notion by analyzing the cost of equity capital effect of adopting an IAAP.

This paper makes several contributions to the existing literature. First, we thoroughly examine the effects of adopting a new accounting regime both theoretically and for our specific setting. In doing so, we respond to Holthausen's (2003) call for research "determining the marginal effects of accounting standards, incentives, ownership structure, institutional features of the capital markets and enforcement on the quality of financial reporting" (p. 273).

Second, we develop a new method of comparing cost of equity capital for companies applying IAAP. This method has the advantages of not being biased by the quality of analysts' forecasts (like residual income models) and of mitigating the problem of self-selection of companies adopting new accounting regimes. Consequently, our sample is substantially bigger and less biased compared to other studies (e.g., Leuz & Verrecchia, 2000), since we do not lose (small) companies that are typically not followed by analysts.

Third, we are the first to differentiate between subperiods of introducing IAAP in Germany. Our results support the expectation that the institutional changes over time distinctly influence the effect on the cost of equity capital.

Fourth, although the classical Fama–French three-factor model has been successfully used in a variety of empirical studies (e.g., Fama & French, 1998; Liew & Vassalou, 2000), the German capital market has been relatively overlooked in such studies. Furthermore, previous studies have examined the Fama–French three-factor model across different countries, but to our knowledge this is the first study to consider different accounting regimes in a homogenous institutional setting. Our findings suggest that the type of accounting regime applied is a priced risk factor in the multi-factor model.

Finally, we contribute to the literature comparing IAAP, like IAS IFRS and U.S.-GAAP, to domestic GAAP. For our setting we find that the adoption of these accounting regimes is associated with reduced cost of equity capital.

The remainder of this paper is organized as follows. In Section 2, we summarize related strands of the literature. In Section 3 we describe the institutional background of our study. Our hypotheses are developed in Section 4. In Section 5 we develop the research design. In Section 6 we present the data and descriptive statistics, followed by our econometric results in Section 7. Section 8 concludes with a summary of our results and discusses implications for future research.

2. Related literature

2.1. Information quality and cost of equity capital

The link between information quality and cost of equity capital is one of the most fundamental and controversial subjects in recent accounting research. Theory suggests a negative relationship between the quality of (accounting) information, on the one hand, and the estimation risk and information asymmetry for investors, and, hence, the cost of equity capital, on the other hand (Habib, 2006).

Also, the level of disclosures is considered to be essential for cost of equity capital. Diamond and Verrecchia (1991) argue that voluntary disclosures reduce information asymmetries among informed and uninformed investors and find that higher levels of disclosure reduce estimation risk. Assuming estimation risk as not being completely diversifiable, investors will require a return premium as compensation for additional risk components. This premium is interpreted as a higher cost of equity capital. Botosan (2006) thoroughly reviews the link between disclosure and cost of equity, asserting that “extent theory strongly supports the hypothesis that greater disclosure reduces cost of equity capital” (p. 39). But she also admits that the underlying assumption that public disclosure mitigates information asymmetry is not true for all studies, suggesting the need for additional research in this field.

There are other critical voices regarding the assumption that public disclosure mitigates information asymmetry by displacing private information. Verrecchia (2001) misses an underlying theory and attests no unambiguous empirical evidence for a positive association between information quality and cost of equity capital. Kim and Verrecchia (1994) argue that public disclosure might be processed into private information again, also by informed investors. They state that more complex information might improve the quality of private information of informed investors even more than the information quality of public information for less informed investors (Kim & Verrecchia, 1991).

As Hail and Leuz (2006) argue, the favorable effects of more disclosure are not predictable as they might be relatively small or (to a large extent) captured by traditional proxies of risk. Several theoretical studies argue that the size of the economy examined might influence the magnitude of these effects (Clarkson & Thompson, 1990; Coles, Loewenstein, & Suay, 1995; Clarkson, Guedes, & Thompson, 1996; Easley & O'Hara, 2004; Hughes, Liu, & Liu, 2007).

Easley and O'Hara (2004) find that a higher proportion of private information increases cost of equity capital, whereas cost of equity capital is decreased by higher dispersion of private information and higher precision of private and public information. They see private information as inducing a new form of systematic risk and highlight that investors require compensation for that risk. They attest that “individual firms can influence cost of equity capital by choosing features like accounting treatments” (Easley & O'Hara, 2004, p. 1554).

Hughes et al. (2007) work can be seen as an extension of Easley and O'Hara (2004). In contrast to their predecessors, they find that in large economies idiosyncratic risk is not priced. They call the fact that a large number of empirical studies presume information asymmetry is priced, because of having to trade with privately informed investors, “a commonly held misperception” (Hughes et al., 2007, p. 707). This price protection effect, also characterized in Easley and O'Hara (2004), is in fact driven by under-diversification and will disappear in large economies, in their opinion. Nevertheless, while controlling for total information, they show that high information asymmetry does lead to high cost of equity capital.

In our study, we investigate the impact of the adoption of IAS IFRS and U.S. GAAP by German companies from 1998–2004. We argue that the specific institutional setting in Germany and its changes over time call into question the positive impact, implicitly supporting a detailed analysis. Our results provide evidence a lower cost of equity capital for companies applying IAAAP in Germany. However, the cost of equity capital effects of applying IAAAP is different for the three subperiods examined. Moreover, we document that the type of accounting regime applied is a priced risk factor in our sample.

2.2. Determinants and impacts of the adoption of internationally accepted accounting principles

Various studies have addressed the determinants and impacts of the adoption of internationally accepted accounting principles (IAAP). One stream of research identifies attributes of companies which voluntarily change to IAAP (e.g., such analyses are included in Leuz & Verrecchia, 2000; Gassen & Sellhorn, 2006).

The second stream of research investigates whether the adoption of IAS/IFRS and U.S. GAAP causes significant changes to financial statements. For German companies, Moya and Oliveras (2006) on average find statistically significant increases in equity, but less obvious effects on net income. Several other studies corroborate these results (Küting, Dürr, & Zwimer, 2002; Burger, Fröhlich, & Ulbrich, 2004; Burger, Schäfer, Ulbrich, & Zeimes, 2005; Burger, Feldrappe, & Ulbrich, 2006; Küting & Zwimer, 2007).

A third stream of literature examines differences in earnings attributes and accruals between the accounting regimes. Whereas many studies find a higher earnings quality for IAS/IFRS companies compared to German GAAP companies in terms of certain measures, e.g., timeliness, predictability, conservatism, earnings management, value relevance, and analysts' forecast accuracy (Ashbaugh & Pincus, 2001; Barth, Landsman, & Lang, 2007; Bartov, Goldberg, & Kim, 2005), findings of other studies suggest similar results for both accounting regimes (Van Tendeloo & Vanstraelen, 2005; Goncharov, 2005). Some studies are inconclusive (Hung & Subramanyam, 2007) or even provide evidence for a higher earnings quality of German GAAP with reference to certain attributes (Gassen & Sellhorn, 2006). Comparing the earnings attributes of IAS/IFRS and U.S. GAAP, studies find a higher earnings quality for U.S. GAAP (Bartov et al., 2005; Barth, Landsman, Lang, & Williams, 2006; Goncharov & Zimmermann, 2006) or inconclusive results (Van der Meulen, Gaeremynck, & Willekens, 2007). Reasons for the mixed results of these "accounting quality studies" might be that the comparison of earnings attributes across accounting regimes could be biased and that the self-selection of companies applying different accounting regimes could confound the results. Moreover, these studies only focus on certain summary measures, neglecting additional information included in financial statements, e.g., the composition and presentation of assets or net income and the notes as well as other information instruments like cash flow statements. Finally, the implications that can be drawn from certain measures are debatable (e.g., see Holthausen & Watts, 2001, for value-relevance studies).

A fourth stream of studies focuses on the capital-market effects of the adoption of international accounting regimes. To determine these effects, these studies rely on various measures, like abnormal returns (Auer, 1996, 1998) stock price volatility (Leuz & Verrecchia, 2000; Cuijpers & Buijink, 2005), bid-ask spreads (Leuz & Verrecchia, 2000; Leuz, 2003; Gassen & Sellhorn, 2006), percentage of trading days (Gassen & Sellhorn, 2006) or analyst-forecast based cost of equity capital measures (Cuijpers & Buijink, 2005; Daske, 2006; Daske, Hail, Leuz, & Verdi, 2007). No clear conclusions have been drawn from these studies concerning the capital-market impact of the adoption of IAS/IFRS or U.S. GAAP.

Prior studies on the capital market effect of the adoption of IAAP in Germany rest upon very specific samples (Leuz & Verrecchia, 2000) or on other time periods (Daske, 2006). Moreover, all of these previous studies on the capital-market effects are conducted on a firm

basis, do not highlight the specific institutional background of the country they examine, and fail to explore the development of the impact over time. Unlike these studies, we focus on a comprehensive sample of the entire voluntary-adoption period of IAAP in Germany between 1998 and 2004, shed light on the possible effects of the institutional setting and of changes in this setting as well as of accounting principles on the cost of equity capital impact and apply a new methodology of measuring the impact of adoption of IAAP in Germany.

2.3. Measurement of cost of equity capital

A firm's cost of equity capital is usually defined as the expected return on a firm's stock (e.g. Lambert, Leuz, & Verrecchia, 2007). In other words, cost of equity capital is the minimum rate of return investors require to provide equity capital to the firm (Botosan, 2006). Researchers have suggested and applied a variety of means to measure cost of equity capital, each with specific advantages and drawbacks. Besides indirect measures or proxies (e.g., stock return volatility), researchers apply direct measures of cost of equity capital like residual income and discounted cash flow models (e.g. Gebhardt, Lee, & Swaminathan, 1999), the Capital Asset Pricing Model (CAPM) (e.g. Fama, & Macbeth, 1973), or multi-factor models (e.g. Barth, Landsman et al., 2007).

Many studies assume that the CAPM is descriptive and that market beta is a good proxy for non-diversifiable risk. If so, beta does include any estimation risk. However, by using historical data to proxy for expected market risk premiums, the CAPM treats estimated parameters as if they were true, ignoring estimation problems. Therefore, the overriding conclusion in the literature is that the CAPM is not descriptive, and theory suggests that market beta does not capture estimation risk. Investor's uncertainty is not taken into account (Botosan, 2006). The fundamental debate about estimation risk being diversifiable (not priced) or non-diversifiable (priced) is still ongoing, though. For example, one possible counter-argument is that information relevance declines with the degree of diversification in large populations (e.g., Cready & Gurun, 2007).

In discounted-cash-flow models, cost of equity capital can be described as the risk-adjusted discount rate that investors apply to the expected future cash flows in order to derive the current stock price. Implementations of these models are the Botosan and Plumlee (2002) model, based on the short-horizon form of the classic dividend growth model, as well as the Easton (2004) price-earnings growth-ratio model, based on the abnormal growth in earnings. Daske (2006) directly estimates the expected cost of equity-capital effects through the implied rate of return of a residual income model utilizing financial analysts' consensus earnings forecasts and stock prices. General shortcomings of all the discounted cash-flow models lie in determining the forecast horizon and the terminal value (Easton, 2006).

Moreover, the use of analysts' forecasts has further disadvantages. Forecasts for firms that have changed from domestic principles to IAAP may tend to have a different degree of optimism than forecasts for firms that have not changed. These forecasts of the expected rate of return are generally likely to be higher than the real cost of equity capital (Easton, 2006). Generally, in all these models, analyst forecasts serve as proxies for market beliefs. One common criticism, however, is that this implies measurement errors, since analysts cannot perfectly reflect market beliefs. Consequently, these type of models regularly perform

unsatisfactorily in tests of construct validity (e.g., Easton & Monahan, 2005). In addition, analysts typically only follow companies with a high visibility or market capitalization which might induce a selection bias (Francis, LaFond, Olsson, & Schipper, 2004).

In the meanwhile, many researches have tried to extend the classical CAPM. The revolutionary work for today's research practice was the three-factor model suggested by Fama and French (1992, 1993), which rendered the classical CAPM obsolete. Based on factor-mimicking portfolios, they showed that the CAPM beta was not an effective or insightful model in their U.S. market studies. Instead, they introduced new regressors to indicate a value premium that compensates the risk missed by the CAPM: the "small-minus-big" factor (SMB), which represents the firms' size in terms of market capitalization, and the "high-minus-low" factor (HML) which stand for the ratio of book-to-market value.

The factor-mimicking portfolio approach introduced by Fama and French was also applied to accounting oriented research. Francis, LaFond et al. (2005) create an accruals quality factor-mimicking portfolio (AQ factor) to estimate asset pricing regressions. Ecker et al. (2006) propose their "e-loadings" concept as returns-based representation of earnings quality. They view earnings quality as a measure of information risk and see information uncertainty as a non-diversifiable (priced) risk factor, gaining theoretical support from Easley and O'Hara (2004), as well as Leuz and Verrecchia (2005).

In our study, we use both the CAPM and a factor-mimicking portfolio approach that incorporates the differences between the accounting regimes applied as a new factor in our model. This prevents measurement errors and selection bias which might be present in analyst-based cost-of-equity-capital estimates. To our knowledge, no other study has applied such a model to compare the effects of IAAP.

3. Institutional background

3.1. German financial reporting requirements

In Germany, accounting principles and rules are not released by a private standard setter, but are enacted by the legislature and codified in the German Commercial Code (*Handelsgesetzbuch, HGB*). It is accompanied by standards and norms established by court decisions or by the reporting practice. German GAAP encompasses all codified and noncodified rules, standards, and norms a company has to observe when preparing financial statements (Leuz & Wüstemann, 2004).

All German companies are required to provide individual financial statements of the legal entity according to German GAAP. These statements become the basis for determining distributable income, deriving taxable income, and other legal provisions (Haller & Eierle, 2004). In addition, parent companies having one or more subsidiaries are obliged to prepare consolidated financial statements. German GAAP was basically required in these statements until 2005.

In the mid 90 s, German multinational companies started to apply IAS and U.S. GAAP³ due to a cross-listing in the United States or due to a perceived need for a more investor-

³ Thereby, companies adopted different reporting strategies, e.g., a parallel reporting, providing two full sets of financial statements or reconciliations of income and shareholders' equity (Leuz & Verrecchia, 2000).

oriented reporting (Haller, 2002). Ultimately, this forced the German legislature to enact the Capital Raising Facilitation Act (*Kapitalaufnahmeerleichterungsgesetz, KapAEG*) which allows publicly listed companies to report consolidated financial statements according to IAAP, consequently substituting for the provisions of German GAAP (§ 292a HGB). However, companies preparing consolidated financial statements under U.S. GAAP in accordance with this option were generally not obliged to comply with the disclosure requirements of the SEC (Wüstemann, 2001) and were not subject to the enforcement of the SEC, unless they were cross-listed in the United States.

Since the enactment of the Capital Raising Facilitation Act the number of listed companies in Germany exercising this option to adopt IAAP has increased. Moreover, the listing regulations of the New Market (*Neuer Markt*), a market segment of the German Stock Exchange for growth firms between 1997 and 2003, required companies to apply IAAP (Glaum & Street, 2003).

Since 2005, all publicly traded European companies (including those in Germany) are required to prepare consolidated accounts under IFRS according to the IAS Regulation EC No. 1606/2002 (with a few exceptions).⁴ Due to the so called “member state options” of the IAS Regulation, the German legislature has allowed companies to provide additional individual accounts under IFRS (besides the individual accounts under German GAAP) for publication purposes and has passed the option to apply IFRS for consolidated accounts to all non-publicly traded companies.

3.2. Accounting standards under investigation

Fundamental differences exist between general properties of German GAAP and IAAP. First, IAAP are developed by a private standard-setting body within a specified due process, whereas in Germany the parliament owns the standard-setting authority for accounting rules. Even though in 1998 the German Accounting Standards Board (GASB) was founded, the private-sector standard-setting power of this board is still restricted to developing recommendations for consolidated financial statements and non-compliance with these recommendations is not sanctioned (Sellhorn & Gornik-Tomaszewski, 2006).

Second, German GAAP is more strongly principles based and offers more explicit choices (e.g., for the treatment of goodwill) than the IAAP. However, until recently, important areas (e.g., stock options) were not (sufficiently) covered by standards and/or interpretations under IAS/IFRS. Furthermore, some provisions of IAS/IFRS and U.S. GAAP are far more complex in comparison to German GAAP. For example, the revenue recognition according to the percentage of completion method is more complex than the completed-contract method, the treatment of actuarial gains and losses from pension obligations is more complex than the general rule to recognize such adjustments at once, and the impairment test (especially for cash-generating units) is more complex than a simple write-down to the replacement costs. However, it has to be taken into account that in

⁴ Companies publicly traded both in the European Union and on a regulated third-country market and which are preparing another internationally accepted accounting system (especially U.S. GAAP) in their consolidated accounts are allowed to defer the application of IFRS until 2007. This also holds for companies which only have publicly traded debt securities.

certain areas, like revenue recognition issues, German GAAP is likely to become complex as well when tax law, court decisions, and particular standards (like GAS, which can be at least factually binding) have to be considered.

Third, German GAAP is – in contrast to the other accounting regimes investigated – considerably influenced by tax considerations. Consolidated financial statements following German GAAP are derived from individual financial statements, which are closely tied to the tax accounts and serve as the basis for determining dividend restrictions. Due to the so-called “congruency principle” or “authoritativeness principle” (*Maßgeblichkeitsprinzip*) the determination of accounting income and taxable income are directly interrelated (Pfaff & Schröer, 1996). Primarily, this principle has an impact on the individual accounts of companies. Until 2002, it was also possible to include tax-induced accounting practices into consolidated accounts. In 2002, however, the Transparency Act abolished this option.

Fourth, under IAS several items of income or expense are recognized directly in equity (e.g., foreign currency translations SFAS 52.13 SFAS 52.20 SFAS 52.46; IAS 21.32 21.37 21.39(c) 21.45; cash flow hedges SFAS 133.18(c), IAS 39.95; revaluations of available-for-sale financial assets SFAS 115.13 115.15 115.16, IAS 39.51 39.55 IAS 39.57) and thus two different performance measures are defined (i.e., net income and comprehensive income). Under German GAAP only one item of income or expense (i.e. foreign currency translations) is recognized directly in equity, leading to differences in the adherence to the clean-surplus relation.

Finally, U.S. GAAP and IAS/IFRS clearly focus on providing an undistorted picture of the financial position of a company. Yet, German GAAP aims at investor protection and is largely biased by the “principle of prudence.” This divergence in objectives leads to different recognition, measurement, and disclosure provisions. Table 1 summarizes the most important differences.

Several changes in the accounting regimes have occurred in the last decade. Table 2 gives an overview of changes in U.S. GAAP, IAS/IFRS, and German GAAP from 1998 until 2005. It is difficult or perhaps impossible to determine the impact of these changes on the quality of financial statements and on the cost of equity capital for individual companies.

By focusing on both the quantity and quality of the revision of standards or the issuance of new standards, we determine two crucial points in time where a major change of at least one investigated accounting regime has occurred. First, in 1998 U.S. GAAP introduced a new standard for the disclosure of comprehensive income and under IAS, a revision of IAS 1, and German GAAP new requirements for cash flow statements and segment reports became effective. Second, in 2000, new provisions for derivatives and hedge accounting under U.S. GAAP and IAS 36 IAS 39, as well as a revision of IAS 16, became effective. Third, the new standard for goodwill and six other standards became effective under U.S. GAAP, and under German GAAP the option to include tax-induced accounting practices into consolidated accounts was abolished. Finally, in 2005 the so-called “Improvements Project,” which changed 13 standards, revised two others and introduced four new ones became effective under IFRS, and the Accounting Reform Act brought several revisions and new requirements for German GAAP.

3.3. German corporate governance and enforcement system

The corporate governance system in Germany is fundamentally different from the Anglo-Saxon system. These differences are due to different legal systems or cultural peculiarities.

Table 1
Major differences between IAS/GAAP, IFRS, and German GAAP

	US GAAP	IFRS	German GAAP
<i>1. Recognition</i>			
Goodwill	Recognition of goodwill is mandatory (SFAS 141.43, IFRS 3.51)		Option to recognize it or to offset it directly against retained earnings (§ 309 I S. 3 HGB)
Self-generated intangible assets	Basically no capitalization of development costs for self-generated intangible assets (SFAS 2, 86, 142, SOP 98.5, 98.1)	Requires the capitalization of development costs for self-generated intangible assets when certain prerequisites are fulfilled (IAS 38, SIC 32)	No capitalization of costs for self-generated intangible assets allowed (§ 248 II HGB)
Derivatives	Recognition of derivatives (SFAS 133, IAS 39)		Recognition only when costs of acquisition have occurred
Lease agreements	Lease agreements are more often classified as finance leases (SFAS 13, 28, 29, 66, 89 IAS 17, SIC 15, SIC 2, IFRIC 4)		Classified with reference to specific tax rules and relatively often classified as operating leases (tax law is relevant)
Deferred tax assets	Temporary concept is relevant for the recognition (SFAS 109, IAS 12)		Timing concept is relevant for the recognition (§ 274 and 306 HGB)
Revenues from (long term) construction contracts	Percentage of completion method (ARB 45, SOP 81-1; IAS 11)		Basically no recognition before the goods or services have been finished (§ 252 I No. 4 HGB)

2. <i>Measurement</i> Revaluation of assets	Fair value-based measurement of certain financial assets is required (SFAS 142, 144)	Fair value-based measurement of certain financial assets is required and of fixed as well as intangible assets is allowed (IAS 16, 36, 38, 40)	No upward revaluation to fair value above historical cost is allowed (§ 253 I HGB)
Depreciation and impairment of fixed assets	Depreciation charges are determined by the judgement of the management, an impairment test most often based on a reporting unit (cash-generating unit) is required under certain circumstances (SFAS 142, 144, IAS 36)		Depreciation charges are often determined with reference to the tax rules. Fixed assets are valued at the lower replacement cost when the write-off is estimated to be permanent (§ 253 II HGB)
Inventories	A full-cost approach is mandatory (SFAS 151, ARB 43, IAS 2)		Provides an option to use a value between and including direct cost and full cost (§ 255 II HGB). Refers to tax rules and thus uses tax determined measurement methods (interest rate usually 6% and no anticipation of future salary increases), actuarial gains and losses are usually recognized at once
Pension liabilities	Projected unit credit using a market-based interest rate and consideration of future salary increases, different options for treating actuarial gains and losses from pension obligations (SFAS 86, IAS 19)		
3. <i>Presentation and disclosures</i>			
Presentation of balance sheet and income statement	No standardized presentation format, only certain items that have to be included (SFAS 6, 109) [Additional requirements by the SEC for companies listed in the United States]	No standardized presentation format, only certain items that have to be included (IAS 1)	Highly standardized presentation formats (§§ 266, 275 HGB)
Notes	Numerous explanatory notes		
			Rather low level of disclosure

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Major changes in U.S. GAAP, IFRS, and German GAAP 1998–2005

U.S. GAAP	IFRS	German GAAP
1 Changes effective for fiscal period 1998 SFAS 130 Reporting Comprehensive Income Issued June 1997, Effective date for fiscal years beginning after December 15, 1997 SFAS 131 Disclosures about Segments of an Enterprise and Related Information Issued June 1997, Effective date for fiscal years beginning after December 15, 1997 SFAS 132 Employers' Disclosures about Pensions and Other Postretirement Benefits Issued February 1998, Effective date for fiscal years beginning after December 15, 1997	IAS 1 (rev. 1997) Presentation of Financial Statements Issued August 1997, Effective date for fiscal years beginning on or after July 1, 1998 IAS 33 (1997) Earnings per Share Issued February 1997, Effective date for fiscal years beginning on or after January 1, 1999 IAS 17 (rev. 1997) Leases Issued December 1997, Effective date for fiscal years beginning on or after January 1, 1999 IAS 19 (rev. 1998) Employee Benefits Issued February 1998, Effective date for fiscal years beginning on or after January 1, 1999 IAS 36 (1998) Impairment of assets Issued June 1998, Effective date for fiscal years beginning on or after July 1, 1999	Law for the Strengthening of Control and Transparency (KonTraG) Issued April 30, 1998, Effective date for fiscal years ending after December 31, 1998, additional requirements for the management report (Lagebericht), e.g. description of major risks (§ 315 I HGB), segment reporting and cash flow statement mandatory in the notes for publicly listed companies (§ 297 I HGB)
2 Changes effective for fiscal period 1999 SFAS 134 Accounting for Mortgage-Backed Securities Retained after the Securitization of Mortgage Loans Held for Sale by a Mortgage Banking Enterprise Issued October 1998, Effective date for the first fiscal quarter beginning after December 15, 1998 SFAS 135 Revisitation of FASB Statement No. 75 and Technical Corrections Issued February 1999, Effective date for financial statements issued for fiscal years ending after February 15, 1999		
3 Changes effective for fiscal period 2000 SFAS 133 Accounting for Derivative Instruments and Hedging Activities Issued June 1998, Effective date: Deferred to all fiscal quarters of all fiscal years beginning after June 15, 2000 by FAS 137		

SFAS 137 *Accounting for Derivative Instruments and Hedging Activities* – *Deferral of the Effective Date of FASB Statement No. 133*
 Issued: June 1999, Effective date: June 1999
 SFAS 138 *Accounting for Certain Derivative Instruments and Certain Hedging Activities*
 Issued: June 2000, Effective date: for all fiscal quarters of all fiscal years beginning after June 15, 2000

IAS 38 (1998) *Intangible assets*
 Issued: September, 1998; Effective date: for fiscal years beginning on or after July 1, 1999
 IAS 39 (rev. 2000) *Financial Instruments: Recognition and Measurement*
 Issued: October, 2000; Effective date: for fiscal years beginning on or after January 1, 2000
 IAS 16 (rev. 1998) *Property, Plant and Equipment*
 Issued: 1998, Effective date: for fiscal years beginning on or after July 1, 1999
 IAS 37 (1999) *Provisions, Contingent Liabilities and Contingent Assets*
 Issued: July 1, 1999, Effective date: for fiscal years beginning on or after July 1, 1999
 IAS 10 (rev. 1999) *Events after the Balance Sheet Date*
 Issued: May, 1999, Effective date: for fiscal years beginning on or after January 1, 2000

+ Changes effective for fiscal period 2001

SFAS 139 *Recession of FASB Statement No. 53 and amendments to FASB Statements No. 63, 89, and 121*
 Issued: June 2000, Effective date: for financial statements for fiscal years beginning after December 15, 2000

SFAS 140 *Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities*
 Issued: September 2000, Effective date: for transfers and servicing of financial assets and extinguishments of liabilities occurring after March 31, 2001 and for disclosures relating to securitization transactions and collateral for fiscal years after December 15, 2000

IAS 40 (2000) *Investment Property*
 Issued: April, 2000, Effective date: for fiscal years beginning on or after January 1, 2001

IAS 25 (rev. 1998) *Investments in Associates*
 Issued: December, 1998 (revised by IAS 39),
 Effective date: for fiscal years beginning on or after January 1, 2001
 IAS 31 (rev. 1998) *Interests in Joint Ventures*
 Issued: December, 1998 (revised by IAS 39),
 Effective date: for fiscal years beginning on or after January 1, 2001

(continued on next page)

IAS / IFRS / German GAAP	IAS / IFRS	German GAAP
<p>IAS 141 <i>Business Combinations</i> Issued June 2001, Effective date for all business combinations initiated after June 30, 2001</p>	<p>IAS 32 (rev. 1998) <i>Financial Instruments: Presentation</i> Issued December, 1998 (revised by IAS 39), Effective date for fiscal years beginning on or after January 1, 2001</p>	
<p>Changes effective for fiscal period 2002</p>	<p>IAS 19 (rev. 2000) <i>Employee Benefits</i> Issued October, 2000, Effective date for fiscal years beginning on or after January 1, 2001</p>	
<p>IAS 142 <i>Goodwill and Other Intangible Assets</i> Issued June 2001, Effective date for fiscal years beginning after December 31, 2001, goodwill acquired in business combinations after June 30, 2001, shall not be amortized</p>	<p>IAS 19 (rev. 2002) <i>Employee Benefits</i> Issued May, 2002, Effective date for fiscal years beginning on or after May 31, 2002</p>	<p><i>Transparenz Act (TransPaG)</i> Issued July 19, 2002, Effective date for fiscal years ending after December 31, 2001 (some rules, others for years ending after December 31, 2002) disclosure about the compliance with the Corporate Governance Code (§ 161 AktG), segment reporting, cash flow statement and statement of changes in equity mandatory for publicly traded companies as separate statements (§ 297 I 2 HGB), option to include tax-induced accounting practices into the consolidated accounts is abolished (§ 308 III HGB was deleted)</p>
<p>SFAS 143 <i>Accounting for Asset Retirement Obligations</i> Issued June 2001, Effective date for fiscal years beginning after June 15, 2002</p>		
<p>SFAS 144 <i>Accounting for the Impairment or Disposal of Long-lived Assets</i> Issued August 2001, Effective date: for financial statements issued for fiscal years beginning after December 15, 2001</p>		
<p>SFAS 145 <i>Rescission of FASB Statements No. 4, 44, and 64, Amendment of FASB Statement No. 13, and Technical Corrections</i> Issued: April 2002, Effective date: for financial statements issued on or after May 15, 2002</p>		
<p>SFAS 146 <i>Accounting for Costs Associated with Exit or Disposal Activities</i> Issued June 2002, Effective date: for exit or disposal activities initiated after December 31, 2002</p>		

- SFAS 147 Acquisitions of Certain Financial Institutions*
 Issued: October 2002, Effective date: for acquisitions on or after October 1, 2002
- SFAS 148 Accounting for Stock-Based Compensation Transition and Disclosure*
 Issued: December 2002, Effective date: for fiscal years ending after December 15, 2002, for transition guidance and annual disclosure provisions, for financial reports containing financial statements for interim periods beginning after December 15, 2002, for interim disclosure provisions
- 6 Changes effective for fiscal period 2003
- SFAS 149, Amendment of Statement 133 on Derivative Instruments and Hedging Activities*
 Issued: April 2003, Effective date: for contracts entered into or modified after June 30, 2003, for hedging relationships designated after June 30, 2003, for provisions that relate to Statement 133
- Implementation Issues that have been effective for fiscal quarters that began prior to June 15, 2003, apply in accordance with their respective effective dates, for paragraphs 7(a) and 23(a), apply to both existing contracts and new contracts entered into after June 30, 2003
- SFAS 150 Accounting for Certain Financial Instruments with Characteristics of both Liabilities and Equity*
 Issued: May 2003, Effective date: for financial instruments entered into or modified after May 31, 2003, otherwise effective at the beginning of the first interim period beginning after June 15, 2003, except for mandatorily redeemable financial instruments of nonpublic entities, which are subject to the provisions of this Statement for the first fiscal period beginning after December 15, 2003

IAS 41 (2000) Agriculture
 Issued: December, 2000; Effective date: for fiscal years beginning on or after January 1, 2003

Table 2 (continued)

US GAAP	IFRS	German GAAP
SFAS 132 (revised 2003) <i>Employers' Disclosures about Pensions and Other Postretirement Benefits</i> Issued: December 2003. Effective date: for domestic plans, for all new provisions except for estimated future-benefit-payments disclosures, effective for fiscal years ending after December 15, 2003, for foreign plans and nonpublic entities, for all new provisions, and for estimated future-benefit-payments disclosures for all entities, effective for fiscal years ending after June 15, 2004, and for interim-period disclosures, effective for quarters beginning after December 15, 2003		

- 7 Changes effective for fiscal period 2004
- IFRS 1 (2003) First-time Adoption of International Financial Reporting Standards*
Issued: June 19, 2003.
Effective date: for fiscal years beginning on or after January 1, 2004
- IAS 38 (rev. 2004) Impairment of assets*
Issued: March 31, 2004; Effective date: for fiscal years beginning on or after April 1, 2004

- 8 Changes effective for fiscal period 2005
- SFAS 151 *Inventory Costs*
 Issued: November 2004; Effective date: for inventory costs incurred during fiscal years beginning after June 15, 2005
- SFAS 152 *Accounting for Real Estate Time-Sharing Transactions – an amendment of FASB Statements No. 66 and 67*
 Issued: December 2004; Effective date: for financial statements for fiscal years beginning after June 15, 2005
- IAS 32 (rev. 2003) *Financial Instruments: Presentation*
 Issued: December 17, 2003; Effective date: for fiscal years beginning on or after January 1, 2005
- Improvements Project IAS 1, 2, 8, 10, 16, 17, 21, 24, 27, 28, 31, 33, 40, (all rev. 2003)
 Issued: December 18, 2003;
 Effective date: for fiscal years beginning on or after January 1, 2005
- IFRS 2 (2004) *Share-based Payment*
 Issued: March 31, 2004; Effective date: for fiscal years beginning on or after January 1, 2005
- IFRS 3 (2004) *Business combinations*
 Issued: March 31, 2004; Effective date: for fiscal years beginning on or after January 1, 2005
- IFRS 4 (2004) *Insurance contracts*
 Issued: March 31, 2004; Effective date: for fiscal years beginning on or after January 1, 2005
- IFRS 5 (2004) *Non-current Assets Held for Sale and Discontinued Operations*
 Issued: March 31, 2004;
 Effective date: for fiscal years beginning on or after January 1, 2005
- IAS 39 (rev. 2004) *Financial Instruments: Recognition and Measurement*
 Issued: 2004; Effective date: for fiscal years beginning on or after January 1, 2005
- Accounting Reform Law (BilReG)*
 Issued: December 9, 2004; Effective date: for fiscal years ending after December 31, 2004: disclosures about auditor fees for publicly traded companies (§ 314 No. 9 HGB); additional disclosures for financial instruments (§ 314 No. 10 and 11 HGB); additional requirements for the management report (*Lagebericht*), e.g. description of major prospects and risks using several performance measures as well as hedging and risk-management strategies (§ 289 I and II HGB); abolition of certain options concerning the consolidation of companies (§ 295 HGB was deleted); cash flow statement and statement of changes in equity mandatory for all companies as separate statements and only voluntary segment reporting (§ 297 I HGB)

Essentially, Germany has a civil or code law system in contrast to the common law system in the United States (e.g., Haller & Walton, 2003) and it is characterized by a relatively high degree of uncertainty avoidance as well as collectivism in comparison to other countries (Hofstede, 1984).

The corporate governance system of a German joint-stock corporation, which is the legal structure of nearly all listed companies,⁵ is often characterized as being insider-controlled and stakeholder-oriented (Schmidt, 2004). The joint-stock corporations have a two-tier system with a management board (*Vorstand*) for the executive management of the company and a separate supervisory board (*Aufsichtsrat*) for the overseeing of the management board.⁶ As several different stakeholder groups are represented in the supervisory board, the German governance system is often characterized as stakeholder-orientated, where internal control mechanisms play a central role (Franks & Mayer, 1997; Hackethal, Schmidt, & Tyrell, 2005).

Until 2005, besides statutory auditors, no external enforcement mechanism for overseeing the compliance of companies with accounting standards had been in place. Auditors published a short audit report to the public and provided a long audit report to the supervisory board. Based on this report, the supervisory board assessed the compliance of the financial statements with the accounting rules and the appropriateness of the accounting policies applied (Naumann, 2000).

During the last decade, several legal changes have affected these corporate-governance mechanisms. The monitoring of the management board by the supervisory board has been improved by the Law for the Strengthening of Control and Transparency (*Kontroll- und Transparenzgesetz, KonTraG*) (Nietsch, 2005) in 1998 and the Transparency Act (*Transparenz- und Publizitätsgesetz, TransPuG*) in 2002. The *KonTraG* included audit reforms changing the objective of the audit as well as the reporting requirements and the legal liability for auditors. These reforms increased the monitoring role of audits in Germany (Gassen & Skaife, 2007). Moreover, due to an amendment of the law for commercial stock companies, the compulsory establishment of risk-management systems was required (§ 91 II of the Stock Corporation Act, *Aktiengesetz, AktG*).

A corporate governance code implemented in 2002 provides standards of best practice (Nietsch, 2005; Noack & Zetzsche, 2005). In § 161 AktG an obligation to “comply-or-explain” was included for listed companies which should facilitate the acceptance of these standards. However, some argue that these reforms have brought no structural change for the governance mechanisms described above (Nietsch, 2005) or that can rather be seen as a “marketing instrument” which should increase the attractiveness of German companies’ shares to international investors (Noack & Zetzsche, 2005).

Two important reforms have had an impact on the enforcement system. First, the Accounting Reform Law of 2004 (*Bilanzrechtsreformgesetz, BilReG*) implemented certain measures strengthening the independence of statutory auditors and modified the audit report (§§ 318–322 HGB) and the Auditor Oversight Act (*Abschlussprüferaufsichtsgesetz, APAG*) established the

⁵ Some companies are partnerships limited by shares (*Kommanditgesellschaft auf Aktien, KGaA*) and having at least one personally liable partner, e.g., Henkel KGaA or Merck KGaA. In 2004 the European Company (*Societas Europaea, SE*) was introduced as a legal structure for German companies by the legislature. In 2006 and 2007, respectively, Allianz and Fresenius were the first companies to adopt this legal structure in Germany.

⁶ The SE provides companies an option to establish a one-tier or two-tier board system (Noack & Zetzsche, 2005).

Auditor Oversight Commission (*Abschlussprüferaufsichtskommission, APAK*) for overseeing the statutory auditors (Haller, Ernberger, & Kraus, 2006). Second, an external enforcement system was established by the Accounting Law Control Act of 2004 (*Bilanzkontrollgesetz, BilKoG*) which included §§ 342b–342d HGB into the German Commercial Code. This two-step system comprises a privately organized enforcement body called Financial Reporting Enforcement Panel (*Deutsche Prüfstelle für Rechnungslegung, DPR*) and a state authority called Supervisory Authority for Financial Services Institutions (*Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin*) (Delvaille et al., 2005; Noack & Zetzsche, 2005).

3.4. Germany's capital market

Only a small proportion of German companies is publicly listed on a stock exchange. While there are about one million limited liability companies in Germany, only 15,000 stock corporations are registered, from which approximately 1000 are listed on regulated markets. Most companies in Germany, especially the smaller ones are held privately (Noack & Zetzsche, 2005).

Traditionally, the German capital market is often seen as bank-based (Baetge et al., 1995; Haller & Walton, 2003; Vitols, 2005). A major part of debt and also equity financing is provided by a few, dominant, universal banks, the so-called “house banks” (*Hausbanken*) (Elsas & Krahen, 2003). Besides being major creditors of companies, banks also hold large stakes of the companies’ equity, can increase their influence by acting as proxies for their clients using depositary voting rights, and play a key role in the internal corporate governance of companies (Fohlin, 2005). Moreover, there are many cross-holdings between publicly listed companies (Schilling, 2001), leading to a high ownership concentration in comparison to other countries (Hackethal et al., 2005; Enriques & Volpin, 2007). Being a typical bank-based system, households asset are largely held as bank deposits and not as investments in shares (Vitols, 2005).

Since the foundation of the New Market in 1997, the role of equity in the financing of companies has become more important (e.g., the number of IPOs has increased) and the number of stockholders has increased (Vitols, 2005). After the burst of the capital market bubble in 2001, the public interest in stock investments has declined.

In particular, since the tax reform in 2000, banks have decreased their large equity stakes in listed companies and, thus, their influence (Vitols, 2005; Hackethal et al., 2005). However, to a certain extent, insurance companies have replaced banks in their role as dominant shareholders of German companies (Vitols, 2005). As a result, raising equity is still less important for the external financing of companies and shareholdings of households are still significantly lower than is the case in other countries. Consequently, the general capital market situation in the German capital market has not changed structurally so far (Hackethal, 2004; Vitols, 2005) and the financial system can still be regarded as bank-based (Hackethal et al., 2005).

4. Hypotheses development

4.1. Overall impact of adopting IAAP

We investigate the impact of a voluntary adoption of IFRS or U.S. GAAP by German companies in the entire period examined (1998–2004) as well as in several subperiods. The

relation between applying a specific accounting regime and the cost of equity capital is complex and influenced by several factors. Lambert et al. (2007) argue that information provided to investors might have both an indirect and a direct effect on the cost of equity capital. Using similar reasoning, the adoption of IAAP could have an indirect impact on the cost of equity capital by improving the quality and quantity of information, lowering information asymmetry (Gassen & Sellhorn 2006), improving the liquidity of a company's shares by enlarging the investor base (Merton, 1987; Covrig, Defond, & Hung, 2006), and, finally, lowering the compensation required by uninformed investors in terms of returns, which means a lower cost of equity capital (Easley & O'Hara, 2004).

In addition, adopting IAAP may impact cash flows directly. On the one hand, those could be negative due to the costs of adoption as well as the application of the more complex IAAP. On the other hand, positive impacts could emerge because the adoption of IAAP could improve brand recognition which might lead to the recruiting of international employees, enhance international co-operations or acquisitions, and foster the implementation of value-based management systems (Weißenberger, Stahl, & Vorstius, 2004).

Three major problems impede evaluating these effects separately. First, influential factors, like the incentives of managers and auditors (Ball et al., 2003; Ewert & Wagenhofer, 2005; Gassen & Sellhorn, 2006), the expertise and capabilities of managers, auditors and users of financial statements, other institutional settings like corporate governance or enforcement and the importance or the integration of the capital market (Hail & Leuz, 2006) could have diverse impacts on the (indirect and direct) relations between standards and the cost of equity capital for the different accounting regimes. Especially, the low rate of listed companies in Germany in comparison to other countries and the small percentage of people holding shares might decrease opportunities for diversification and, therefore, influences the pricing of estimation risk. This is particularly true when a strong home-bias towards domestic stocks prevails. For Germany, such a bias is found in several studies (e.g., Tesar & Werner, 1995; Kilka & Weber, 2000). In contrast, the integration of the stock markets in Europe and even worldwide could mitigate this effect (Harvey, 1991).

Second, these effects might interact with each other (Gietzmann & Trombetta, 2003) and with the factors explained, which hampers their exploration. For example, the interaction of accounting standards and of accounting practice is difficult or rather impossible to disentangle (Schipper, 2005; Sellhorn & Gornik-Tomaszewski, 2006).

Third, concepts like earnings quality, disclosure level, or information asymmetry are unobservable and thus have to be measured by proxies (e.g., earnings quality by persistence, predictability, conservatism, timeliness, discretionary accruals, or value relevance). Moreover, these concepts disregard the direct cash-flow impacts of adopting IAAP. This makes it difficult to unambiguously investigate the overall impact of adopting IAAP.

We assume that the cost of equity capital is an important objective for adopting IAAP. Several survey studies document this motive for adopting IAAP (Pellens & Tomaszewski, 1999; Weißenberger et al., 2004). Also, the EU and standard-setters like the FASB aim at lowering the cost of equity capital when deciding what accounting standards should be applied. Moreover, only the cost of equity capital is able to capture indirect and direct effects which pertain to the adoption of IAAP. Thus, we investigate the overall link between the adoption of IFRS or U.S. GAAP and the cost of equity capital.

The impact of adopting IAAP in Germany is difficult to predict. The application of IAAP should reflect the performance of a company in a more timely way and with a lower degree of conservatism. The higher extent of value-relevant items recognized especially under IAS/IFRS (e.g., intangible assets) and the more timely and less conservative measurement of items under IAS/IFRS and U.S. GAAP (e.g. at fair value) should improve the ability of investors to predict future cash flows and thus lower estimation risk. The higher extent of explanatory notes and of additional disclosures required by IAS/IFRS and U.S. GAAP in comparison to German GAAP should, all else being equal, lower the degree of information asymmetry. A company's decision to switch to IAAP could be regarded as a strong commitment to increased disclosure because it is very costly to reverse (Leuz & Verrecchia, 2000; Daske, 2006). As IAS/IFRS and U.S. GAAP are explicitly directed at investors, the adoption of these accounting regimes in Germany should cause an exchange of private information granted to certain stakeholders represented on the supervisory board for public information (Daske, 2006). This should have a decreasing effect on the degree of asymmetric information. However, Francis, Khurana, and Pereira (2005) argue that the need for public information in bank-based financial systems like Germany is lower than in market-based systems and that weak investor protection might impair the credibility of the information provided by IAS/IFRS or U.S. GAAP. Therefore, these effects are expected to be favorable for IAAP, but could turn out to be relatively low in Germany.

In contrast, previous studies find that principles-based accounting standards lead to a higher earnings quality (Webster & Thornton, 2005), which suggests, all else equal, a higher earnings quality of German GAAP and partly IAS/IFRS in comparison to U.S. GAAP. The reduced comparability of financial statements under IAS/IFRS and U.S. GAAP due to missing specification of a reporting format for the income statement and balance sheet could deteriorate the quality of information about German companies available to investors. In addition, the adoption of IAS/IFRS or U.S. GAAP might only represent the use of a label without resulting in a material change of the transparency of financial statements (Daske, Hail, Leuz, & Verdi, 2007). This might hold particularly in countries like Germany where individual shareholders have less influence on the governance of the management and managers have more room for pursuing their interests (Ball, 2006). Furthermore, the enforcement of IAS/IFRS or U.S. GAAP financial statements might have been more difficult for the statutory auditors and the supervisory boards especially in the first years of adoption because they lacked sufficient expertise in the new accounting regimes. Glaum and Street (2003) provide empirical evidence on this topic. Following the arguments of Kim and Verrecchia (1994), the adoption of the more complex accounting regimes, IFRS and U.S. GAAP, could even have increased the information asymmetry because informed investors are able to gain more insights than less-informed investors. This argument might hold particularly for non-institutional investors in Germany, as they rather neglect additional disclosures and focus only on the balance sheet and income sheet (Deutsches Aktieninstitut, 2005). However, even analysts might have difficulties in using IFRS or U.S. GAAP for earnings forecasts (Daske, 2005). A further disadvantage of the adoption of IAAP could be that the previous domestic standards have more effectively addressed the specific needs of financial statement users or have accommodated the particular legal or economic system of a country (Armstrong, Barth, Jagolinzer, & Riedl, 2007).

Based on this discussion, it ultimately remains an empirical question whether over the examined period the adoption of IAS/IFRS and U.S. GAAP by German companies has decreased their cost of equity capital. We therefore state the following hypothesis:

H1. In Germany, the cost of equity capital is higher for companies applying German GAAP than for companies applying IAS/IFRS or U.S. GAAP.

4.2. Impact of adopting IAAP in subperiods

In a second analysis, we examine whether and how changes in accounting standards, as well as in the German capital market, corporate-governance system, and enforcement system could have an effect on the impact of applying IAAP on the cost of equity capital. As the description of the institutional background in the previous section shows, several changes have taken place during the sample period. It is likely that these changes will result in different effects of adopting IAS/IFRS or U.S. GAAP. As explained above, in the years 1998, 2000, 2002, and 2005 major revisions of accounting standards or new standards became effective. Moreover, the years 1998, 2002, and 2005 brought reforms for the corporate governance and enforcement systems in Germany. Consequently, we identify three relatively stable subperiods in the investigated period: (1) 1998–1999, (2) 2000–2001 and (3) 2002–2004.

At the beginning of the first subperiod (1998–1999), several new disclosures and presentation requirements under IAS and U.S. GAAP became effective which might have a positive impact on the cost-of-equity capital effect of applying these two accounting regimes. Moreover, the capital markets in Germany became more popular especially to noninstitutional investors, which might have increased investor's demands for more useful decision information. This would *ceteris paribus* also imply a positive impact of an adoption of IAAP, because German GAAP was regarded as being less suitable for those purposes. In contrast, the IAS provided many options and had no standards for several important issues in this time period. Moreover, the compliance level of companies applying IAAP in Germany, especially in the first years of application, was low, since companies and auditors were not used to the new accounting regimes. In addition, many analysts and investors in Germany might not have been able to cope with the more complex provisions.

In 2000, which is the beginning of the second subperiod, several new standards as well as revisions of key standards became effective under IAS, which restricted options or filled important gaps of missing rules. Furthermore, companies, investors, financial analysts, and auditors had become used to the provisions of IAAP and thus were able to exploit the higher degree of transparency. Various IPOs took place in this time period and the interest in investor-oriented accounting standards increased.

In the third subperiod (2002–2004), the Transparency Act became effective, abolishing the option which was allowed under German GAAP to include tax-induced accounting practices into consolidated accounts. Under U.S. GAAP, the new provisions for measuring goodwill are rather complex and provide a considerable degree of discretion to managers. Concerning IFRS, a revised standard for employee benefits (IAS 19 (rev. 2002)) might have an impact on transparency and thus on the cost of equity capital. The credibility in

accounting numbers, and especially in those under IAAP, was damaged due to some accounting scandals of companies listed in Germany's New Market that have adopted either IAS/IFRS or U.S. GAAP.

Concerning the cost of equity capital effects of applying IAAP in the three subperiods presented, we state the following hypothesis:

H2. The cost-of-equity-capital impact of applying IAS IFRS or U.S. GAAP in comparison to that of applying German GAAP is different in the time periods 1998–1999, 2000–2001, and 2002–2004.

5. Research design

5.1. Portfolio analyses

The starting point for our analysis is the classical CAPM. This model describes how the market return above risk free rate explains a stock or portfolio of stocks. The CAPM model is described by the following equation:

$$r_{it} - r_t^{rf} = \alpha_i + \beta_i (r_{mt} - r_t^{rf}) + \varepsilon_{it} \quad (1)$$

where r_{it} represents the individual stock (or portfolio) i at time t , r_t^{rf} indicates the risk-free interest rate, and r_{mt} the market return at time t . The Greek letters stand for the intercept α_i , the slope parameter β_i , and the residuum ε_{it} of each individual stock (or portfolio) i .

However, for voluntary changes in the disclosure level, the CAPM results could be affected by self-selection bias. When variables like company characteristics explaining the decision of managers to change the disclosure level are omitted in the analysis and are correlated to certain priced risk factors, the results are biased (Hail, 2002). One way to mitigate this problem of self-selection is to include known risk factors like market capitalization and market-to-book value into the analysis (Berk, 1995). Therefore, we use an enhanced multi-factor model, gaining theoretical support from Francis et al. (2004) as well as Francis, LaFond et al. (2005), and control for these known priced risk factors. One assumption of the model is that there is an information factor in our sample which could not be diversified away and thus is priced. A second alternative for controlling a possible self-selection bias is a two-step regression approach, which is applied in the firm-level analyses in the next section.

The multi-factor model we use in the following is based on the original Fama and French model, with the following multi-factor equation:

$$r_{it} - r_t^{rf} = \alpha_i + \beta_{i1} (r_{mt} - r_t^{rf}) + \beta_{i2} \text{SMB}_t + \beta_{i3} \text{HML}_t + \varepsilon_{it} \quad (2)$$

The first part of Eq. (2) is similar to Eq. (1), with the only difference being that the Greek slope parameters β_{ij} are now numbered from $j=1, 2, 3$ for the three regressors $(r_{mt} - r_t^{rf})$, SMB_t , and HML_t . SMB_t ("Small minus Big") represents the size of the companies. HML_t stands for a factor based on the book-to-market ratio. Firms with high (low) book-to-market values are regarded as "value stocks" ("growth stocks") (Fama & French, 1993).

Similar to Fama and French (1993) we split our sample of companies into six portfolios:

- S-H “Small-High” (small size, high book-to-market ratio)
- S-M “Small-Medium” (small size, medium book-to-market ratio)
- S-L “Small-Low” (small size, low book-to-market ratio)
- B-H “Big-High” (big size, high book-to-market ratio)
- B-M “Big-Medium” (big size, medium book-to-market ratio)
- B-L “Big-Low” (big size, low book-to-market ratio)

We rank our sample first according to the size in terms of market value. The median discriminates between the “small” and “big” firms. Then we rank our sample according to the book-to-market ratios and separate the highest 30% as “high”, the lowest 30% as “low,” and the resulting 40% as “medium.”

The companies remain in one of the six portfolios for one year (starting in July, ending in June of the next calendar year). Reference date for the re-alignment of the portfolios is the end of June of the previous period for the size, and the end of December of the previous period for the book-to-market ratio. The monthly returns of the companies are averaged – weighted with their market value – in each of the six portfolios. We obtain: r^{S-H} , r^{S-M} , r^{S-L} , r^{B-H} , r^{B-M} , r^{B-L} .

Eventually, we compute SMB_t and HML_t as follows:

$$SMB_t = (r^{S-H} + r^{S-M} + r^{S-L})/3 - (r^{B-H} + r^{B-M} + r^{B-L})/3 \quad (3)$$

$$HML_t = (r^{S-H} + r^{B-H})/2 - (r^{S-L} + r^{B-L})/2 \quad (4)$$

With these factors, the influence of size on book-to-market is reduced and vice-versa.

Based on the Fama and French approach (2), our new model (that we call “GM model”), is augmented with two new factors that represent the impact of the different accounting regimes:

$$r_{it} = r_{it}^{IF} - \alpha_i + \beta_{i1}(r_{mt} - r_{it}^{IF}) + \beta_{i2}SMB_t + \beta_{i3}HML_t + \beta_{i4}GMI_t + \beta_{i5}GMU_t + \varepsilon_{it} \quad (5)$$

The factors GMI_t and GMU_t explain the accounting regime impact. GMI_t is the return difference between the portfolios of companies using German GAAP and IAS/IFRS (“German GAAP minus IAS IFRS”) and GMU_t is the return difference between German GAAP and U.S. GAAP (“German GAAP minus U.S. GAAP”) portfolios. For this analysis, we calculate the market value weighted means for each of the three accounting-regime groups and compute the difference for the “GM” factors as described for each month in the sample.

As illustrated in Table 3, extending the number of portfolios according to the accounting regime results in: 18 factor-mimicking portfolios.

We assign a company to a fiscal year as follows: The reporting date determined the June–July year used. Each June–July year is assigned to the accounting regime used in the reporting date of that year. For example, if a company’s reporting date is December 31, 2000, the accounting regime applied at that point is assigned to the July 2000-to-June 2001 year.

Table 3
18 analyzed portfolios

		Book-to-market		
		Low	Medium	High
<i>German GAAP</i>				
Size	Small	S-L-G	S-M-G	S-H-G
	Big	B-L-G	B-M-G	B-H-G
<i>IAS/IFRS</i>				
Size	Small	S-L-I	S-M-I	S-H-I
	Big	B-L-I	B-M-I	B-H-I
<i>U.S. GAAP</i>				
Size	Small	S-L-U	S-M-U	S-H-U
	Big	B-L-U	B-M-U	B-H-U

The 18 portfolios are built upon three criteria: (1) *accounting regime* applied (G: German GAAP, I: IAS/IFRS, U: U.S. GAAP), where companies are assigned into the July-to-June year by the accounting regime they used at the reporting date within that period; (2) *book-to-market value* (L: M: H: Low: Medium: High), where the book value of equity is divided by the market value of equity, we rank our sample according to the book-to-market ratios and separate the highest 30% as “high,” the lowest 30% as “low,” and the resulting 40% as “medium”; (3) *size* in terms of market value of equity (S: B: Small: Big), where the median discriminates between the “small” and “big” firms. The companies remain in one of the 18 portfolios for one year (starting in July, ending in June of the next calendar year). Reference date for the re-alignment of the portfolios is the end of June of the previous period for the size, and the end of December of the previous period for the book-to-market ratio.

Within these 18 portfolios, we again construct the market value weighted average of the monthly returns. Ultimately, we compute our new factors as follows:

$$GMI_t = (r^{S-H-G}_t + r^{S-M-G}_t + r^{S-L-G}_t + r^{B-H-G}_t + r^{B-M-G}_t + r^{B-L-G}_t) / 6 - (r^{S-H-I}_t + r^{S-M-I}_t + r^{S-L-I}_t + r^{B-H-I}_t + r^{B-M-I}_t + r^{B-L-I}_t) / 6 \tag{6}$$

$$GMU_t = (r^{S-H-G}_t + r^{S-M-G}_t + r^{S-L-G}_t + r^{B-H-G}_t + r^{B-M-G}_t + r^{B-L-G}_t) / 6 - (r^{S-H-U}_t + r^{S-M-U}_t + r^{S-L-U}_t + r^{B-H-U}_t + r^{B-M-U}_t + r^{B-L-U}_t) / 6 \tag{7}$$

The idea of these factors is that, provided that these differences are significant, they help us to explain the performance of the returns of our 18 portfolios and account for an information factor related to the different disclosure levels among the three accounting regimes examined. Knowing the accounting regime of a portfolio should lead to greater explanatory power within the model.

We apply the seemingly unrelated regression (SUR) technique. Since it would be unrealistic to expect the equation errors to be uncorrelated, this method explicitly allows us to analyze a system of multiple equations with cross-equation parameter restrictions and correlated error terms.⁷

⁷ As a robustness check, we also apply the ordinary least squares (OLS) method. The inference is even higher for OLS, but for the technical reasons mentioned we nevertheless incorporate the SUR method.

Table 4
Descriptive analysis for all 18 portfolios returns (July 1997–June 2005, max. 96 observations)

		Mean			StdDev			Obs	N		Mean			StdDev			Obs	N
G	L									M								H
S	S-I-G	-0.0072	0.0672	0.0672	0.0672	96	17.4	S-M-G	0.0045	0.0423	96	36.4	S-H-G	0.0095	0.0510	96	43.0	
B	B-I-G	0.0069	0.0604	0.0604	0.0604	96	29.1	B-M-G	0.0147	0.0630	96	43.1	B-H-G	0.0146†	0.0561	96	22.6	
I	I									M								H
S	S-I-I	0.0180	0.1275	0.1275	0.1275	72	19.0	S-M-I	0.0042	0.1204	84	22.0	S-H-I	0.0136	0.1105	84	21.7	
B	B-I-I	0.0101	0.0572	0.0572	0.0572	96	21.5	B-M-I	0.0121	0.0635	96	24.0	B-H-I	0.0028†	0.0773	84	17.6	
I	I									M								H
U	U									M								H
S	S-L-U	-0.0205	0.1601	0.1601	0.1601	84	12.3	S-M-U	0.0014	0.1184	72	14.0	S-H-U	0.0260	0.0982	60	10.0	
B	B-I-U	0.0122†	0.1227	0.1227	0.1227	96	11.4	B-M-U	-0.0039	0.0684	96	11.8	B-H-U	0.0119	0.0979	72	6.5	

The portfolio construction is described in Table 1. Table 2 shows the descriptive results of our analysis for the 18 portfolios. We have monthly return observations from July 1997 until June 2005. Mean: The monthly returns of the portfolios are averaged by using market value of equity weights of the companies. StdDev: standard deviation of the mean returns. Obs: observations – number of months data are available for the specific portfolio. N: average number of firms included for computing the mean/standard deviation per observed month.

†: “Value premium” exceptions; these values do not reflect the Fama and French “value premium”; Fama and French found in 1992 that returns grow with higher book-to-market values

5.2. Firm-level analyses

As already mentioned, dealing with voluntary adoption of IAAP can lead to a potential self-selection bias between the different accounting regime portfolios. One way of tackling this issue is to include an information-quality factor in the factor-mimicking portfolio analysis. But researchers have also successfully implemented another means of addressing the self-selection problem at the firm-level. By applying the two-stage procedure, proposed by Heckman (1978), we can control for self-selection by incorporating the Inverse Mills Ratio (see e.g. Leuz & Verrecchia, 2000; Gassen & Sellhorn, 2006; Hung & Subramanyam, 2007).

In the first stage, we estimate a probit model to analyze the firms' probability of adopting IAS/IFRS or U.S. GAAP, given a variety of explaining factors:

$$\text{IAAP}_{it} = \text{Probit}(\delta_0 + \delta_1 \log(\text{ME}_{it}) + \delta_2 \text{ROA}_{it} + \delta_3 \text{CAPINT}_{it} + \delta_4 \text{MANUF}_{it} + \delta_5 \text{NEWMARKET}_{it} + \delta_6 \text{USUK}_{it} + \varepsilon_{it}) \quad (8)$$

where for firm i and time t IAAP_{it} is a dummy variable for applying IAAP (i.e. IAS/IFRS or U.S.-GAAP), $\log(\text{ME}_{it})$ is the natural logarithm of the market equity, ROA_{it} is the return on assets, CAPINT_{it} is the capital intensity (long-term assets divided by total assets), MANUF_{it} is a dummy variable indicating if the company is a manufacturing company ($\text{SIC} < 4000$), NEWMARKET_{it} is a dummy for being included in the New Market (*Neuer*

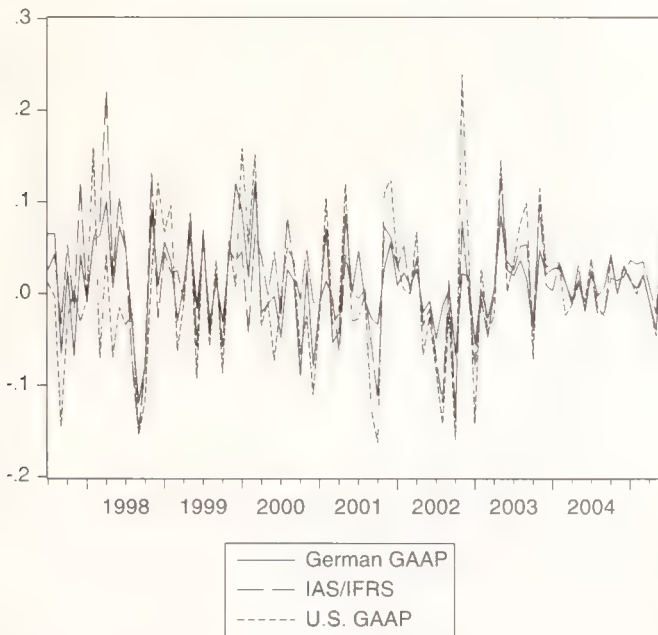


Fig. 1. Excess returns of the German GAAP portfolio, the IAS/IFRS portfolio, and the U.S. GAAP portfolio from July 1997 to June 2005 (market value weighted).

Markt) segment of the Frankfurt stock exchange, and $USUK_{it}$ is a dummy indicating whether the company is cross-listed on the U.S. or U.K. market.

Using this first stage probit estimation, we can compute the Inverse Mills Ratio (λ_{it}) to account for self-selection in the second stage.

In the second stage, we analyze whether the adoption of IAAP (indicated by the variable $IAAP_{it}$) significantly influences the cost of equity capital estimates which we derive based upon our factor-mimicking models. The important difference here is that we simultaneously control for self-selection bias and other effects included in the first-stage regression (e.g., cross-listing or New Market membership). Therefore, we estimate in a second-stage regression:

$$CoEC_{it}^m = \varphi_0 + \varphi_1 IAAP_{it} + \varphi_2 \log(ME_{it}) + \varphi_3 \lambda_{it} + \varepsilon_{it} \quad (9)$$

where for firm i and time t $CoEC_{it}^m$ is the cost of equity capital calculated by method m (CAPM or GM-Model), $IAAP_{it}$ is a dummy variable for applying IAS/IFRS or U.S.-GAAP, $\log(ME_{it})$ is the natural logarithm of the market equity, and λ_{it} is the Inverse Mills Ratio. Even though we have already specified the cost of equity capital estimation model in the factor-mimicking section already, this procedure can be meaningful as a *ceteris paribus* analysis for cost of equity capital versus the adoption of IAAP.

Table 5
Descriptive statistics of yearly data (1998–2004), 494 firms

Panel A: Continuous variables

	Observations	Mean	Median	Maximum	Minimum	Std. Dev.
$\log(ME)$	2910	11.965	11.756	19.193	6.674	2.053
ROA	2924	0.016	0.047	0.839	−4.310	0.209
CAPINT	2883	0.346	0.334	0.951	0.000	0.195
CoEC (CAPM)	3394	0.060	0.062	2.997	−1.588	0.271
CoEC (GM Model)	3088	0.050	0.072	3.976	−1.903	0.406
Inverse Mills Ratio	2468	0.496	0.563	0.667	0.288	0.122

Panel B: Discrete variables

	Observations	Obs with Dep=0	Obs with Dep=1
IAAP	3319	1777	1542
MANUF	3952	2688	1264
NEWMARKET	3952	2736	1216
USUK	3952	3672	280

Notes: $\log(ME)$ is the natural logarithm of the market value of equity, ROA is the return on assets, CAPINT is the capital intensity (long-term assets divided by total assets), CoEC (CAPM) is the cost of equity capital calculated by the CAPM, CoEC (GM Model) is the cost of equity capital calculated by the GM model, λ_{it} is the Inverse Mills Ratio calculated based on the first-stage regression in Table 12. IAAP is a dummy variable indicating if the company is applying internationally accepted accounting principles (IAS/IFRS or U.S.-GAAP). MANUF is a dummy variable indicating if the company is a manufacturing company (SIC < 4000). NEWMARKET is a dummy variable for being included in the New Market (*Neuer Markt*) segment of the Frankfurt stock exchange, and USUK is a dummy for indicating whether the company is cross-listed in the U.S. or U.K. market.

Table 6
Capital Asset Pricing Model $r_{it} = \alpha_i + \beta_1 r_{mt} + \beta_2 r_{it}^* + \varepsilon_{it}$

	α_i	$\beta_1 [r_{mt} - r^*]$	Adj. R^2	α_i	$\beta_1 [r_{mt} - r^*]$	Adj. R^2	α_i	$\beta_1 [r_{mt} - r^*]$	Adj. R^2
G	L			M			H		
S	S-L-G	-0.0127**	0.3065***	0.0002	S-M-G	0.2945***	S-H-G	0.0033	0.4219***
B	B-L-G	-0.0027	0.7091***	0.0042	B-M-G	0.8387***	B-H-G	0.0077*	0.5079***
I	L			M			H		
S	S-L-I	0.0372***	1.3864***	0.0155	S-M-I	1.0132***	S-H-I	0.0015	0.9368***
B	B-L-I	0.0022	0.6355***	0.0022	B-M-I	0.7675***	B-H-I	0.0046	0.5948***
U	I			M			H		
S	S-L-U	-0.0401***	1.6401***	0.0167*	S-M-U	1.2004***	S-H-U	0.0132	0.5944***
B	B-L-U	0.0067	1.4431***	0.0121**	B-M-U	0.6439***	B-H-U	0.0014	1.0962***

The portfolio construction is described in Table 1. The Capital Asset Pricing Model (CAPM) describes how the market excess return ($r_{mt} - r^*$) explains the excess return of a portfolio ($r_{it} - r^*$). The excess return means the difference between the actual returns and the risk-free market interest rate. We apply the seemingly unrelated regression (SUR) technique. Abbreviations: α_i , intercept; $\beta_1 [r_{mt} - r^*]$ estimated parameter β_1 for market excess return $r_{mt} - r^*$; Adj. R^2 adjusted R^2 (goodness-of-fit), **, and *** means that these values are significant at the 10%, 5%, and 1% level.

† Exceptions to the thesis that the CAPM betas of the German GAAP portfolios are smaller than their equivalents in the IAS IFRS and U.S. GAAP portfolios.

6. Sample selection and descriptive statistics

6.1. Portfolio analyses

We use data concerning the German stock market, sampled monthly from July 1997 to June 2005 (96 months). This ensures that only companies fully applying IFRS or U.S. GAAP regulations are included as IAAP companies. Prior to that period, data quality was poor — e.g., reconciliations only. Our source for the stock returns (adjusted prices), number of common shares outstanding, and book values is the Datastream Advance database. For the risk-free rate we apply the 3-month interest rate of the German Bundesbank (July 1997–December 1998), and after that the EURIBOR 3-month rate as the money market reference rate for the Euro. The type of accounting regime applied and the fiscal year-end data are hand collected from company annual reports, since we found several missing or mistaken entries in the Worldscope database (see Daske et al., 2007, for details). In accordance with former studies (e.g., Ziegler et al., 2007), we exclude companies with a negative book value. Also, finance and insurance companies are excluded from the sample based on the Standard Industrial Classification (SIC 6000 to 6999) since their book values of equity are fundamentally different from those of non-financial companies. No company is allowed to have an interrupted time series. This leaves us with a final sample of 548 companies that we assign into 18 portfolios. To minimize the bias through outliers, we winsorize the return data at the 1% and 99% levels respectively.

Table 4 shows the descriptive results of our analysis for the 18 portfolios, with the mean excess returns, their standard deviations, the number of monthly observations, and the average number of firms per month. Fig. 1 illustrates the timely development of the pooled portfolios into the three main classifications German GAAP, IAS/IFRS, and U.S. GAAP.

The first interesting finding is that our data contain the Fama and French (1992) value premium in the means. We find a positive impact of a high book-to-market ratio on the (excess) returns. In our sample, the mean of the 18 portfolios increases with a rising book-

Table 7

Beta values — comparison between the German GAAP firms, the IAS/IFRS firms, and the U.S. GAAP firms

	Average beta value	Average beta value, weighted with number of observations	CAPM regression of the three combined portfolios	CAPM with new endogenous variables: (with <i>t</i> -statistic)	
				I–G	U–G
<i>G</i>	0.5131	0.5298	0.6232		
<i>I</i>	0.8890	0.8644	0.7255	0.1089**	(1.8415)
<i>U</i>	1.1030	1.1380	0.9723	0.3750***	(4.5772)

G: German GAAP, *I*: IAS/IFRS, *U*: U.S. GAAP, CAPM: Capital Asset Pricing Model; I–G: IAS/IFRS portfolio minus German GAAP portfolio, regressed in CAPM model, U–G: U.S. GAAP portfolio minus German GAAP portfolio, regressed in CAPM model, *, **, and *** means that these values are significant at the 10%, 5%, and 1% level (here one-sided test).

Table 8

Fama and French model: $r_{it} = \alpha_i + \beta_1(r_{mt}) + \beta_2(SMB_t) + \beta_3(HML_t) + \varepsilon_{it}$

G	L	M	
	α_i	$\beta_1 [r_{mt} - r^f]$	
S	S-L-G	-0.0037	-0.0017
B	B-L-G	0.0012	0.0026
I	L		M
S	S-L-I	0.0138**	-0.0068
B	B-L-I	0.0020	0.0046
U	L		M
S	S-L-U	0.0170*	-0.0015
B	B-L-U	0.0022	0.0157***
			0.6867***
		Adj R^2	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
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		β_2 [SMB]	
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		β_2 [SMB]	
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		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
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		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	
		β_2 [SMB]	
		$\beta_1 [r_{mt} - r^f]$	
		β_3 [HML]	

The portfolio construction is described in Table 1. The Fama and French model describes how the market excess return ($r_{mt} - r^f$), the small-minus-big factor (SMB), and the high-minus-low factor (HML) explain the excess return of a portfolio ($r_{it} - r^f$). The excess return means the difference between the actual returns and the risk-free market interest rate. SMB represents the size of the companies, HML stands for a factor based on the book-to-market ratio, analogously to Fama and French (1997). We apply the seemingly unrelated regression (SUR) technique. Abbreviations: α_i : intercept; $\beta_1 [r_{mt} - r^f]$: estimated parameter β_1 for market excess return $r_{mt} - r^f$; $\beta_2 [SMB]$: estimated parameter β_2 for factor SMB; $\beta_3 [HML]$: estimated parameter β_3 for factor HML; Adj R^2 : adjusted R^2 (Goodness-of-Fit). *, **, and *** means that these values are significant at the 10%, 5%, and 1% level.

G	M	F								
		β_2 [SMB]	β_3 [HML]	Adj. R^2		α_i	β_0 [$r_{mt}-r^f$]	β_2 [SMB]	β_3 [HML]	Adj. R^2
S		0.5020***	0.3913***	0.5393	S-I-G	0.0021	0.6426***	0.7294***	0.4508***	0.6289
B		0.3024***	0.0630	0.528	B-I-G	0.0005	0.6219***	0.0101	0.4292***	0.4677
I	M					H				
S		1.1583***	0.0902	0.5061	S-I-I	0.0044	1.1808***	1.3118***	0.4043**	0.5421
B		0.0589	0.4270***	0.6944	B-I-I	0.0107	0.7871***	0.4139***	0.5388***	0.3535
I	M					H				
S		1.0780***	0.1569	0.6901	S-I-U	0.0132	0.6859***	1.3744***	0.6034***	0.5060
B		0.0372	0.1731	0.3601	B-I-U	-0.0174**	1.3953***	0.0442	0.8813***	0.6865

Table 9
Correlations of exogenous factors

	r_{mt}	$r_t^{I/}$	SMB_t	HML_t	GMI_t	GMU_t	G_t	I_t	U_t
$r_{mt} - r_t^{I/}$	1.0000								
SMB_t	-0.1553		1.0000						
HML_t	-0.3298		-0.3771	1.0000					
GMI_t	-0.4365		-0.3470	0.3326	1.0000				
GMU_t	-0.5044		-0.2321	0.4188	0.7484	1.0000			
G_t	0.8911		-0.2844	-0.3030	-0.1921	-0.2757	1.0000		
I_t	0.8293		-0.1810	-0.0947	-0.3737	-0.3047	0.7635	1.0000	
U_t	0.8410		-0.0402	-0.3654	-0.5355	-0.6900	0.6923	0.6432	1.0000

Abbreviations: $r_{mt} - r_t^{I/}$: Market excess return at time t ; SMB_t : Small-minus-Big (market value) factor at time t ; HML_t : High-minus-Low (book-to-market value) factor at time t ; GMI_t : German GAAP-minus-IAS IFRS factor at time t ; GMU_t : German GAAP-minus-U.S. GAAP factor at time t ; G_t : Average returns of the German GAAP companies at time t ; I_t : Average returns of the IAS IFRS companies at time t ; U_t : Average returns of the U.S. GAAP companies at time t .

to-market ratio, with only three exceptions (marked with [†] in Table 4), meaning that the value premium is empirically visible. Ziegler, Schröder, Schulz, and Stehle (2007) discover the same pattern for Germany as well.

However, the second effect, discovered by Fama and French, of a positive impact of a small size (i.e. small market values have higher returns) cannot be confirmed in our data, more to the contrary. This is in accordance with Schrimpf, Schröder, Stehle (2006) and Ziegler et al. (2007). In our opinion this can be seen as a typical German phenomenon. In Germany, the tendency toward public offerings is substantially smaller compared to the United States or the United Kingdom where considerably more small companies are publicly traded.

6.2. Firm-level analyses

For the two-stage approach, we use yearly financial-statement data gained from the DAFNE database⁸ for the period 1998 until 2004.⁹ To have these data available for all firms, however, we had to reduce the sample from the 548 companies referenced above to 494. The cross-listing data are taken from a study of the “Deutsches Aktieninstitut”¹⁰ (Glaum, Thomaschewski, & Weber, 2006). The accounting-regime data are, again, the hand-collected data from the portfolio analysis. We estimate the monthly cost of equity capital for each firm based on the CAPM and GM models using the risk factors from above ($(r_{mt} - r_t^{I/})$, SMB_t , HML_t , GMI_t , and GMU_t). Afterwards, we average the monthly data for every year and multiply them by 12

⁸ DAFNE is a database of detailed financial information for 140 000 German and Austrian companies, hosted by Bureau van Dijk Electronic Publishing (BvDEP), one of Europe’s leading electronic publishers of business information.

⁹ Before 1998, data quality regarding international accounting standards is very low, since only a few companies published IAS or U.S.-GAAP financial statements. After 2004, the adoption of IFRS was mandatory for most of the publicly listed companies.

¹⁰ Deutsches Aktieninstitut e.V. (DAI) is the association of German exchange-listed stock corporations and other companies and institutions with an interest in the capital market. The DAI is an independent, nonprofit institution.

Table 10
 OLS model $r_{it} = \alpha_i + \beta_1 r_{mt} + \beta_2 SMB_{it} + \beta_3 HML_{it} + \beta_4 GMI_{it} + \beta_5 GMU_{it} + \epsilon_{it}$

Country	Model	α_i	β_1	β_2	β_3	β_4	β_5	Adj. R^2
S	S-L-G	0.0086*	0.5973***	0.9540***	0.1425	0.4761***	0.2861**	0.4853
	B-L-G	0.0004	0.7416***	0.0736	0.2350***	-0.0498	0.2744***	0.6167
	I							
Z	S-L-I	0.0103*	0.8940***	0.8612***	0.5180***	0.5190**	0.1296	0.8181
	B-L-I	0.0040	0.6329***	0.0901	-0.0560	-0.5479***	0.3844***	0.5348
	U							
S	S-L-U	0.0116	0.8501***	0.6697***	0.5093***	0.3401	-1.1204***	0.8121
	B-L-U	0.0024	0.9189***	-0.2243	-0.2840**	0.3827*	-1.2483***	0.7410
	G							
S	S-M-G	-0.0035	0.5823***	0.6758***	0.3591***	0.0264	0.2455***	0.6068
	B-M-G	0.0016	0.8222***	0.2244***	-0.0368	0.2921**	-0.1153	0.7604
	I							
S	S-M-I	-0.0018	0.6746***	0.5824***	0.0019	-1.9735***	0.6027***	0.6656
	B-M-I	-0.0026	0.8664***	-0.0123	0.3787***	-0.3461***	0.2303**	0.6981
	I							

U	M								
S	S-M-U	α_i	$\beta_{\beta_i} [r_{mt} \quad r^{\beta_i}]$	$\beta_{\beta_i} [\text{SMB}]$	$\beta_{\beta_i} [\text{HML}]$	$\beta_{\beta_i} [\text{GMI}]$	$\beta_{\beta_i} [\text{GMI}]$	Adj. R^2	
			0.0067	0.4105***	0.7324***	0.1231	0.1098	1.0650***	0.7797
			B	B-M-U	0.0154***	0.5913***	0.0907	0.2146*	0.0337
G									
H									
S	S-H-G	α_i	$\beta_{\beta_i} [r_{mt} \quad r^{\beta_i}]$	$\beta_{\beta_i} [\text{SMB}]$	$\beta_{\beta_i} [\text{HML}]$	$\beta_{\beta_i} [\text{GMI}]$	$\beta_{\beta_i} [\text{GMI}]$	Adj. R^2	
			0.0006	0.7481***	0.8251***	0.4142***	0.1023	0.2105**	0.6750
B	B-H-G	0.0008	0.7050***	0.1207	0.4326***	0.2476*	0.0537	0.4907	
I									
H									
S	S-H-I	α_i	$\beta_{\beta_i} [r_{mt} \quad r^{\beta_i}]$	$\beta_{\beta_i} [\text{SMB}]$	$\beta_{\beta_i} [\text{HML}]$	$\beta_{\beta_i} [\text{GMI}]$	$\beta_{\beta_i} [\text{GMI}]$	Adj. R^2	
			0.0082	0.6990***	0.8039***	0.3815***	1.4755***	0.2136	0.6755
B	B-H-I	0.0082	0.4841***	0.1867	0.5511***	0.4707*	0.1128	0.3539	
U									
H									
S	S-H-U	α_i	$\beta_{\beta_i} [r_{mt} \quad r^{\beta_i}]$	$\beta_{\beta_i} [\text{SMB}]$	$\beta_{\beta_i} [\text{HML}]$	$\beta_{\beta_i} [\text{GMI}]$	$\beta_{\beta_i} [\text{GMI}]$	Adj. R^2	
			0.0162**	1.2680***	0.1017	0.9047***	0.4246	0.3934**	0.6960
B	B-H-U	0.0114	0.2493	1.3003***	0.7412***	0.9536***	1.3604***	0.6635	

The portfolio construction is described in Table 1. The GMI model describes how the market excess return ($r_{\text{Mkt}} - r^f$), the small-minus-big factor (SMB), the high-minus-low factor (HML), the GMI factor explain the excess return of a portfolio ($r_{\text{it}} - r^f$). The excess return means the difference between the actual returns and the risk-free market interest rate. SMB represents the size of the companies, HML stands for a factor based on the book-to-market ratio, analogously to Fama and French (1997). The factors GMI and GMIU explain the accounting regime impact. GMI is the return difference between portfolios of companies using German GAAP and IAS IFRS ("German GAAP minus IAS IFRS") and GMIU is the return difference between German GAAP and U.S. GAAP ("German GAAP minus U.S. GAAP") portfolios. We apply the seemingly unrelated regression (SUR) technique. Abbreviations: $\beta_{\text{S}} [r_{\text{Mkt}} - r^f]$ estimated parameter β_{S} for market excess return $r_{\text{Mkt}} - r^f$, $\beta_{\text{S}} [\text{SMB}]$ estimated parameter β_{S} for factor SMB, $\beta_{\text{S}} [\text{HML}]$ estimated parameter β_{S} for factor HML, $\beta_{\text{S}} [\text{GMI}]$ estimated parameter β_{S} for factor GMI, $\beta_{\text{S}} [\text{GMIU}]$ estimated parameter β_{S} for factor GMIU; Adj. R^2 adjusted R^2 (goodness-of-fit). *, **, and *** means that these values are significant at the 10%, 5%, and 1% level.

Table 11

Improvements of adjusted R^2 Fama and French model versus CAPM and GM model versus Fama and French model

G		I		M		H		
		FF vs. CAPM	GM vs. FF		FF vs. CAPM	GM vs. FF	FF vs. CAPM	GM vs. FF
S	S-L-G	+0.2437	+0.1465	S-M-G	+0.3325	+0.0675	S-H-G	+0.3378
B	B-L-G	+0.0187	+0.0267	B-M-G	+0.0347	+0.0077	B-H-G	+0.1338
								+0.0461
								+0.0230
I		L		M		H		
		FF vs. CAPM	GM vs. FF		FF vs. CAPM	GM vs. FF	FF vs. CAPM	GM vs. FF
S	S-L-I	+0.2985	+0.0070	S-M-I	+0.1893	+0.1595	S-H-I	+0.2344
B	B-L-I	-0.0105	+0.0387	B-M-I	+0.0993	+0.0037	B-H-I	+0.1048
								+0.1334
								+0.0004
U		L		M		H		
		FF vs. CAPM	GM vs. FF		FF vs. CAPM	GM vs. FF	FF vs. CAPM	GM vs. FF
S	S-L-U	+0.2427	+0.0936	S-M-U	+0.2291	+0.0896	S-H-U	+0.3377
B	B-L-U	-0.0395	+0.1268	B-M-U	+0.0070	-0.0012	B-H-U	+0.2083
								+0.1900
								-0.0231

The portfolio construction is described in Table 1. The table shows absolute improvements (+) / deteriorations (–) of adjusted R^2 . Abbreviations: G: German GAAP, I: IAS IFRS, U: U.S. GAAP, L: M: H: Low: Medium: High book to market value, S: B: Small: Big market value (= size), CAPM: Capital Asset Pricing model; FF: Fama and French model; GM: “German GAAP-minus” model.

(see, e.g., Fama & French, 1997) to obtain yearly firm-level cost of equity capital estimates.¹¹ Descriptive statistics of all data are provided in Table 5. Most important to note is that the sample consists almost equally of IAAP (1542) and non-IAAP (1777) companies.

7. Regression results

7.1. Portfolio analyses

Regarding the classical CAPM results in Table 6, we can testify to a fairly high explanatory power. All slope parameters are significant at a level of 1%. The goodness-of-fit is notably high, resulting in an adjusted R^2 of 40.08%, on average, and an adjusted R^2 of 54.78% applying to the market value weighted average.

Looking at the parameter estimates, we find that nine of 12 comparisons between the German GAAP betas and IAS IFRS and U.S. GAAP betas indicate differences for market beta (the other three are indicated with an [†] in Table 6).

Computing the average of the three accounting regime groups, we can also state that German GAAP portfolios have lower betas. Their average is 0.5131, compared to 0.8890

¹¹ The authors estimate the firm-level models for the monthly cost-of-equity-capital data. For the inference, however, the monthly average is used. The difference between the monthly average and the monthly average multiplied by 12, since this is only linear transformation.

Table 12
Forecasts of Cost of Equity Capital (based on CAPM and GM model)

Analysis of Cost of Equity Capital (Based on Data from 2006-2007)									
G		L		M		H			
		CAPM	GM		CAPM	GM		CAPM	GM
S	S-L-G	-0.377%	-0.349%	S-M-G	0.562%	0.651%	S-H-G	1.090%	1.240%
B	B-L-G	1.009%	0.993%	B-M-G	1.759%	1.637%	B-H-G	2.013%	1.996%
I		L		M		H			
		CAPM	GM		CAPM	GM		CAPM	GM
S	S-L-I	-2.065%	-1.804%	S-M-I	-0.389%	-0.221%	S-H-I	1.127%	1.230%
B	B-L-I	1.335%	1.501%	B-M-I	1.553%	1.722%	B-H-I	0.451%	0.584%
U		L		M		H			
		CAPM	GM		CAPM	GM		CAPM	GM
S	S-L-U	-2.228%	-1.546%	S-M-U	-0.197%	0.470%	S-H-U	1.880%	2.774%
B	B-L-U	1.403%	1.152%	B-M-U	-0.045%	0.119%	B-H-U	1.563%	1.812%

The portfolio construction is described in Table 1. The table shows the forecasts for cost of equity capital, based on the CAPM and GM model. Cost of equity is the portfolio's excess-return plus the risk-free rate. Abbreviations: G: German GAAP; I: IAS/IFRS; U: U.S. GAAP; L: M: H: Low: Medium: High book-to-market value; S: B: Small: Big market value (−size); CAPM: Capital Asset Pricing model; GM: "German GAAP-minus" model.

(IAS/IFRS) and 1.1030 (U.S. GAAP). Weighted with the number of observations in each portfolio, we see the same pattern: the German GAAP average is 0.5298 versus 0.8644 (IAS/IFRS) and 1.1380 (U.S. GAAP). Finally, we also regress the return differences between IAS/IFRS and German GAAP, as well as between U.S. GAAP and German GAAP, on the market excess return in the CAPM. Testing the one-sided hypothesis that the resulting betas are smaller than zero can be rejected at a 5%-level for the "IAS/IFRS minus German GAAP" regressand, and at a 1%-level for "U.S. GAAP minus German GAAP".

Table 13
Cost of Equity Capital Comparison (monthly weighted averages)

Table 1. Equity Capital Structure (Industry Weighted Average)			
G		Weighted by observations	Weighted by market value
	CAPM	1.094%	1.496%
	GM	1.115%	1.426%
I		Weighted by observations	Weighted by market value
	CAPM	0.506%	1.267%
	GM	0.670%	1.429%
U		Weighted by observations	Weighted by market value
	CAPM	0.158%	0.832%
	GM	0.472%	0.730%

The table shows a comparison between the forecasts for cost of equity capital, based on the CAPM and GM model, weighted (1) by observations and (2) by market value of equity. The sum of weights in each accounting regime group (G: I: U) totals to one. Abbreviations: G: German GAAP; I: IAS/IFRS; U: U.S. GAAP; CAPM: Capital Asset Pricing model; GM: "German GAAP-minus" model.

regressand. This suggests that both the IAS/IFRS betas and the U.S. GAAP betas are significantly higher than the German GAAP betas. These results (Table 7) provide evidence for the information-risk effect of introducing a “new” accounting regime and leading to higher betas in the CAPM model.

As expected, the extension of the CAPM with the Fama and French factors SMB_t and HML_t , applying the typical Fama and French approach as our second model, leads to an increase in the goodness-of-fit, as indicated by the results in Table 8. The adjusted R^2 rises to 57.20%. However, in terms of the market value weighted average, it goes up less substantially, only to 59.93%. Again, all $(r_{mt} - r_{ft}^*)$ parameters are significant at the 1% level. Out of our 18 portfolios, seven (eight) SMB_t (HML_t) parameters do not achieve the 1% level. This can be explained by the correlation of these two factors in our sample, which leads to collinearity in the regressors and reduces the power of the model (Table 9).

Applying our new model, with the “German GAAP minus IAS/IFRS”-factor (GMI_t) and the “German GAAP minus U.S. GAAP”-factor (GMU_t), results in the best explaining model. Applying the differences between the accounting regimes allows us to estimate our new model stated in Eq. (5). The results are depicted in Table 10.

As before, the highest validity is implied in the $(r_{mt} - r_{ft}^*)$ parameters, followed by the SMB_t and the HML_t parameters. Even though our new regressors, GMI_t and GMU_t , are individually significant only in 11 of 18 cases, the overall explanatory power increases again. The new average adjusted R^2 with 63.51% exceeds the CAPM by 23.43% points and the classical Fama and French model by 6.31% points. In terms of market value weighted numbers, it outperforms the CAPM by 7.78% points and the Fama and French model by 2.63% points.

Table 14

First-stage regression: $IAAP_i = \text{Probit}(\alpha + \delta_1 \log(ME)_i + \delta_2 ROA_i + \delta_3 CAPINT_i + \delta_4 MANUF_i + \delta_5 NEWMARKET_i + \delta_6 USUK_i + \epsilon_i)$

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	-1.045	0.188	-5.563	0.000
log(ME)	0.072	0.015	4.654	0.000
ROA	-0.487	0.151	-3.233	0.001
CAPINT	-0.307	0.149	-2.058	0.040
MANUF	-0.107	0.061	-1.746	0.081
NEWMARKET	1.670	0.077	21.631	0.000
USUK	0.635	0.111	5.721	0.000
Obs with Dep=0	1107	McFadden R-squared		0.219
Obs with Dep=1	1332	LR statistic (6 df)		737.586
Total obs	2439	Probability (LR stat)		0.000

In the first stage, we estimate a probit model to analyze the firms' probability to adopt IAS/IFRS or U.S.-GAAP given different explanatory variables. Variable definitions: $IAAP$ is a dummy variable for applying internationally accepted accounting principles (IAS/IFRS or U.S.-GAAP), $\log(ME)$ is the natural logarithm of the market value of equity, ROA is the return on assets, $CAPINT$ is the capital intensity (long-term assets divided by total assets), $MANUF$ is a dummy variable indicating if the company is a manufacturing company ($SIC < 4000$), $NEWMARKET$ is a dummy for being included in the New Market (*Neuer Markt*) segment of the Frankfurt stock exchange, and $USUK$ is a dummy for indicating whether the company is cross-listed at the U.S. or U.K. market. Based on this regression, we can also calculate the *InvMillsRatio*.

Table 15

Second-stage regression: $\text{CoEC}_{it}^m = \varphi_0 + \varphi_1 \text{IAAP}_{it} + \varphi_2 \log(\text{ME}_{it}) + \varphi_3 \lambda_{it} + \varepsilon_{it}$

Panel A: CAPM-based cost of equity capital estimates

A1) Time period: 1998–2004

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	−0.172	0.046	−3.723	0.000
IAAP	−0.036	0.013	−2.712	0.007
InvMillsRatio	0.052	0.054	0.957	0.339
log(ME)	0.019	0.003	7.019	0.000
R-squared	0.030	F-statistic		21.390
Total observations	2108	Prob (F-statistic)		0.000

A2) Time period: 1998–1999

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	0.568	0.124	4.599	0.000
IAAP	0.100	0.036	2.733	0.007
InvMillsRatio	−0.835	0.142	−5.869	0.000
log(ME)	0.006	0.006	1.064	0.288
R-squared	0.350	F-statistic		42.014
Total observations	238	Prob (F-statistic)		0.000

A3) Time period: 2000–2001

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	−0.320	0.074	−4.323	0.000
IAAP	−0.045	0.020	−2.314	0.021
InvMillsRatio	0.162	0.081	2.002	0.046
log(ME)	0.026	0.004	6.162	0.000
R-squared	0.069	F-statistic		17.600
Total observations	720	Prob (F-statistic)		0.000

A4) Time period: 2002–2004

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	−0.161	0.062	−2.598	0.010
IAAP	0.009	0.020	0.455	0.650
InvMillsRatio	0.142	0.076	1.878	0.061
log(ME)	0.010	0.004	2.534	0.011
R-squared	0.009	F-statistic		3.550
Total observations	1150	Prob (F-statistic)		0.014

Panel B: GM model-based cost-of-equity-capital estimates

Dependent Variable: CoEC (GM model)

Ordinary Least Squares

B1) Time period: 1998–2004

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	−0.103	0.071	−1.458	0.145
IAAP	0.022	0.020	1.091	0.275

(continued on next page)

Table 15 (continued)

Panel B: GM model-based cost-of-equity-capital estimates

B1) Time period: 1998–2004

Variable	Coefficient	Std. Error	z-statistic	Prob.
InvMillsRatio	0.183	0.082	2.217	0.027
log(ME)	0.005	0.004	1.186	0.236
R-squared	0.003	F-statistic		2.014
Total observations	2108	Prob (F-statistic)		0.110

B2) Time period: 1998–1999

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	−0.118	0.135	−0.878	0.381
IAAP	0.036	0.040	0.895	0.372
InvMillsRatio	−0.203	0.155	−1.310	0.191
log(ME)	0.029	0.006	4.584	0.000
R-squared	0.145	F-statistic		13.229
Total observations	238	Prob (F-statistic)		0.000

B3) Time period: 2000–2001

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	−0.633	0.092	−6.910	0.000
IAAP	−0.044	0.024	−1.817	0.070
InvMillsRatio	0.187	0.100	1.862	0.063
log(ME)	0.043	0.005	8.276	0.000
R-squared	0.096	F-statistic		25.359
Total observations	720	Prob (F-statistic)		0.000

B4) Time period: 2002–2004

Variable	Coefficient	Std. Error	z-statistic	Prob.
Constant	0.091	0.102	0.886	0.376
IAAP	0.040	0.033	1.225	0.221
InvMillsRatio	0.245	0.125	1.960	0.050
log(ME)	−0.012	0.006	−1.934	0.053
R-squared	0.006	F-statistic		2.434
Total observations	1150	Prob (F-statistic)		0.063

In the second stage, we analyze whether the adoption of IAAP significantly influences the cost of equity capital estimates. Variable definitions: CoE is the cost of equity capital calculated by CAPM (Panel A) or GM-model (Panel B); IAAP is a dummy variable for applying IAS/IFRS or U.S.-GAAP; ln(ME) is the natural logarithm of the market value of equity; and InvMillsRatio is the Inverse Mills Ratio. We restrict the sample to four different time periods: 1998–2004 (A1, B1), 1998–1999 (A2, B2), 2000–2001 (A3, B3), and 2002–2004 (A4, B4).

To draw a first conclusion, including accounting regime information into the Fama and French model leads to an improvement of the explanatory power.¹² The portfolio returns in our model can be described more precisely than when using the CAPM or the

¹² The adjusted R^2 takes into account the loss of degrees of freedom. Including two additional regressors does not automatically increase the adjusted R^2 .

Fama and French approach. Table 11 illustrates the consolidated comparison of all three models.

As a sensitivity check, we also compare the Schwarz criterion (SC) for the three different models.¹³ Computing the average of the individual SC for the 18 portfolios estimated with Least Squares, we find support for the results obtained by the adjusted R^2 . The GM model has the lowest SC (–3.10) vis-à-vis the Fama and French model (–2.99) and the CAPM (–2.77). Given a specific endogenous variable, the regression model with the lowest SC is regarded to be the best explaining model.

Based on our three models, we can derive the cost of equity capital for the 18 portfolios as expected excess returns less the risk-free rate. The SUR system delivers forecasts of cost of equity capital for both the CAPM and the GM (see Table 12). They are applied to the 18 portfolios.

Most notably, differences between the three accounting regimes are quite obvious for the CAPM-based cost of equity capital (Table 13), as the significant differences of the beta values have already indicated. The German GAAP groups with a market value weighted mean of 1.496% exceed the IAS/IFRS groups (1.267%) and the U.S. GAAP groups with (0.832%) in terms of expected cost of equity capital.

For the GM model calculation, however, the differences are no longer strong. While the U.S. GAAP firms (0.730%) still have lower cost of equity capital, the German GAAP firms (1.426%) and IFRS/IAS firms (1.429%) show no significant difference.

That this relationship is not applicable for the GM estimates is straightforward, given the specification of our new model. Since the GM model already accounts for accounting-regime differences, we do not expect significant differences between the cost-of-equity-capital estimates.

Taken together, these findings support the first hypothesis of our paper. Companies applying German GAAP have to deal with higher CAPM-based cost of equity capital expectations by the investors in comparison to firms that have adopted IAAP. We call this effect “accounting premium” for IAS/IFRS and U.S. GAAP firms vis-à-vis German GAAP firms. The development of a novel multi-factor model that captures the “accounting premium” leads to an improvement of the CAPM and Fama–French models.

7.2. Firm-level analyses

As shown in Table 14, the first-stage regression of the IAAP dummy ($IAAP_{it}$) on the different explaining factors (see Eq. (8)) in a probit model delivers highly significant results.¹⁴ The McFadden R^2 , at 21.95%, is quite substantial; the marginal effects of all explanatory variables are significant at least at the 10%-level. Especially noticeable are the p -values of the New Market dummy and the cross-listing dummy, which are both smaller than 0.0001.

¹³ We prefer using the Schwarz criterion (SC) versus using the Akaike Info criterion, since the SC “punishes” the loss of degrees-of-freedom even more.

¹⁴ Since the mean of our dependent dummy variable IAAP is 0.4646, the probit model has to be preferred to the logit model. For a robustness check, however, we also estimate the logit model, finding no substantial differences between the two approaches.

After computing the Inverse Mills Ratio from the first-stage regression, we analyze the effect of the IAAP dummy on the cost of equity capital, while simultaneously controlling for self-selection (Inverse Mills Ratio) and, implicitly, for cross-listing and New Market membership in our second-stage.

The results are presented in Table 15. We distinguish between the CAPM-based (panel A) and the GM model-based (panel B) cost-of-equity-capital estimates. For each panel we estimate four different time periods: (1) the whole sample (1998–2004), and three subsamples, (2) 1998–1999, (3) 2000–2001, and (4) 2002–2004.

Comparing the second-stage estimations, we find two major results. One, the impact of the IAAP dummy ($IAAP_{it}$) is significantly different for the CAPM versus the GM model. Comparing especially the whole-sample estimations (1998–2004, panels A1 and B1), we find that $IAAP_{it}$ is highly significant for CAPM (p -value 0.007), whereas $IAAP_{it}$ is not significant for the GM model (p -value 0.275). Moreover, for the GM model the F -statistic for the whole sample period has a p -value of 0.110, meaning that all explaining variables are not significant at the 10% level. Looking at all of the panel estimations, while for the CAPM regressions $IAAP_{it}$ is significant in three of four cases with two p -values below 1% and one below 5%, for the GM model regressions $IAAP_{it}$ is significant only in one case (panel B3), with a p -value below 10%.

The rationale for these findings is that the cost-of-equity-capital estimates for the CAPM do not account for accounting-regime differences, while the estimates in the GM model do. Consequently, it is not surprising that on the one hand the IAAP dummy ($IAAP_{it}$) has no significant influence on the cost-of-equity-capital estimates once we include this information when estimating the dependent variable. On the other hand, documenting the differences for the CAPM regressions (panel A), we find significant differences between the regimes, which supports our H1. It is important to note that this time we also control for self-selection, cross-listing, and New Market membership effects.

The second result is that there are time-period differences. Concentrating on the CAPM method (panel A), we find a negative sign for the IAAP dummy ($IAAP_{it}$) for the whole period (1998–2004, panel A1), which is highly significant (p -value 0.007). This supports our first hypothesis that applying an IAAP leads to lower cost of equity capital.

Looking at the subperiods provides more detailed results. For the years 1998 and 1999 the effect was positive (p -value 0.007, panel A2); for the years 2000 and 2001 it was negative (p -value 0.021, panel A3). Our rationale for this observation is as follows: in the beginning, uncertainty dominated the true substantial power of the IAAP, provisions for several important items were missing under IAS, and level of compliance with IAAP was low. These disadvantages at least partly diminished in the second subperiod when, under IAS, several new standards became effective and companies as well as users of financial statements became used to the IAAP.

Yet, for the period 2002–2004, we cannot draw any interference, since $IAAP_{it}$ is not significant. Our explanation for this phenomenon is that in that period new revisions of accounting standards became effective which granted leeway for management's discretion, the commitment to the IAAP decreased after several accounting scandals and that German GAAP abolished the option of including tax-induced accounting practices in the consolidated accounts.

Consequently, this gives support to H2, that differences in the effects of adopting IAAP on the cost of equity capital are time-specific.

Regarding the goodness-of-fit, it is fair to mention that most of the resulting R^2 are not considerably high, which can be seen as a drawback for this analysis. There are two points to mention, however. First, this is economically comprehensible, since we have stated that our cost of equity capital models (CAPM and GM model) already explain the cost of equity capital sufficiently. Consequently, we would even expect that the explaining power of the second-stage regressions is fairly low, meaning that our cost of equity capital methods were efficient before. Second, we see the second-stage as a *ceteris-paribus* analysis. In that context, low R^2 s are in fact also econometrically expectable and acceptable and do not impair the explanatory power, as long as the individual *p*-values are valid and the overall *F*-test does not lead to refusing the significance of all variables (see, e.g., Wooldridge, 2002, p. 41).

In other words, we do not want to explain the calculation of the cost of equity capital in the second stage – we already did this with our portfolio models. Here, a low R^2 is rather a sign for a well-specified cost-of-equity-capital calculation, which can also be seen as a robustness test for our H1.

8. Conclusions

Our results suggest that the voluntary adoption of IAS/IFRS or U.S. GAAP by German companies goes along with a decrease in their cost of equity capital. Notwithstanding the specific institutional framework in Germany, our findings support the general expectation that higher quality accounting standards lead to lower cost of equity capital, using conventional models. We call this effect “accounting premium” for IAAP. These results also hold when controlling for effects like self-selection, cross-listing, and New Market (*Neuer Markt*) listing. Additionally, by developing a novel multi-factor model (that we call the “GM model”), we can capture the “accounting premium” effect and hence improve the CAPM as well as Fama and French model.

Our study calls for more caution in future studies which investigate the relationship between the adoption of a certain accounting regime, information quality, and the cost of equity capital. Several additional effects and factors like accounting incentives, enforcement, other institutional settings, and the properties of the capital market, as well as the interactions of these effects, have to be considered.

The novel methodology we developed for this study uses the classical CAPM and a multi-factor model, based on the Fama and French model, which included the accounting regime information. This methodology has the advantages of not being biased or compromised by estimation errors of analysts’ forecasts, of mitigating disclosure-level differences, and of being applicable to companies that are not followed by financial analysts. The self-selection issue is addressed by using a two-stage estimation procedure, explicitly controlling for self-selection and other effects, like cross-listing and New Market membership.

Similar to Barth, Konchitchki et al. (2007), we find that the inclusion of an information quality or accounting factor improves the performance of the multi-factor model. We therefore provide further evidence that the traditional three-factor model of Fama and French lacks an additional factor which could proxy the level and quality of information provided to investors.

We recognize, however, that our study is subject to caveats. First, we compare the effects of voluntary adoption of IAS/IFRS or U.S. GAAP by German companies. The effects of mandatory adoption in the periods from 2005 on might have been different where companies no longer committed themselves to increased disclosure by adopting IAS/IFRS or U.S. GAAP but instead are obliged to do so. Besides, the new enforcement system in Germany and the new oversight body for statutory auditors, established in 2005, might have impacted the accounting practice. Furthermore, companies, auditors, and investors have gained more expertise in IFRS and U.S. GAAP provisions thus might cope better with the more complex information provided by IAS/IFRS today. In summary, these changes might have lead to a different overall impact of the adoption of IFRS and U.S. GAAP by German companies on the cost of capital capital after 2004.

Second, there is still a controversy in the literature about the assumption of diversifiability of information risk. However, apart from our study several other papers have already found results supporting the view that market beta does not suffice to explain cost of capital capital and see other information risk factors applicable to improve the explanatory power (see, e.g., Francis, LaFond et al., 2005; Botosan, 2006). Multi-factor models are especially crucial for determining cost of equity capital on the firm level for which the diversifiability argument does not apply. We see our research as another empirical contribution toward this discussion.

These two caveats provide opportunities for future research. Studies about the impact of the mandatory adoption of IFRS, the changes in standards of IAS/IFRS and U.S. GAAP, and of the new enforcement system, as well as auditor oversight in Germany, on the information quality and the cost of equity capital might be valuable tasks. Moreover, future research could examine the ability of our multi-factor model in evaluating the cost-of-equity-capital impact of different IAS/IFRS and could test our model in other settings, e.g., to investigate the impact of the adoption of IFRS in other countries or institutional settings.

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Discussion

Discussion of “Analyzing the German Accounting Triad — ‘Accounting Premium’ for IAS/IFRS and U.S. GAAP Vis-à-vis German GAAP”

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Abstract

Ernstberger and Vogler (Ernstberger, J. & Vogler, D., 2008, this issue, “Analyzing the German Accounting Triad with an Enhanced Multifactor Model: ‘Accounting Premium’ for IAS/IFRS and U.S. GAAP Vis-à-vis German GAAP,” *International Journal of Accounting*) examine the concurrent use of three distinct accounting-standard regimes (German GAAP, U.S. GAAP, and IAS/IFRS GAAP) in Germany as a foundation for evaluating the relation between accounting standard regime and equity-return attributes. They find that firms using U.S. or IAS/IFRS GAAP have higher betas but yield lower returns (cost of capital) relative to firms employing German GAAP. They also find that portfolios designed to isolate the return impacts of U.S. and IAS/IFRS GAAP relative to German GAAP are priced in a risk-factor-like fashion. In this discussion, I suggest that a good bit of this empirical evidence is problematic. I also discuss the implausibility of information quality being priced in a Fama and French (Fama, E.F. & French, K.R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance* 47 (2), 427–465) factor-like fashion. Finally, I introduce the importance of conditioning analyses of the relation between firm-level information quality and equity-market return (cost of capital) on the degree to which the shareholder base of a firm holds diversified portfolios.

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Keywords: IFRS; U.S. GAAP; German GAAP; Cost of equity capital; Information quality; Diversification

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Ernstberger and Vogler (2008-this issue) (EV henceforth) employ the concurrent use of three distinct accounting-standard regimes (German GAAP; U.S. GAAP; and IAS/IFRS GAAP) as a foundation for examining how accounting reporting choices impact market returns. In particular, they examine two distinct hypotheses under the assumption that U.S. and IAS/IFRS GAAP provide better firm-level disclosure environments than German GAAP. First, they expect German GAAP firms to have lower betas (systematic risk) than IFRS and U.S. GAAP firms. Second, they expect the return premiums paid by German GAAP firms relative to IFRS and U.S. GAAP firms to be priced as “risk factors.” Third, they expect that German GAAP firms do indeed pay a return premium.

1. GAAP choice and beta

The version of the paper presented at the conference links beta to earnings variability and argues that the smoothing effect of German GAAP carries over into reduced return variability in the form of a lower beta.¹ The current version abandons this notion, correctly so in my opinion, but offers nothing in terms of motivation to replace it. Moreover, the proposition that using non-German GAAP increases beta suggests a consequential positive impact on expected returns. The paper’s new first hypothesis, however, flatly contradicts this suggestion. It claims that non-German GAAP usage decreases cost of capital, which is substantively identical to saying that it decreases expected return. A perspective of the positive association between beta and the use of IAS/IFRS or U.S. GAAP that is reconcilable with the paper’s risk-factor pricing and overall cost-of-capital conclusions is that the causality is reversed. That is, it is not the choice of GAAP that drives the beta effect, but rather that firms with high betas find it more beneficial to choose IAS/IFRS or U.S. GAAP. Under the further assumption (one made by EV) that German GAAP is qualitatively inferior to these two non German alternatives, then, it follows that a heightened systematic risk exposure (beta) motivates firms to reduce overall uncertainty about their future cash flows by choosing better quality disclosures and disclosure frameworks. If the reduction in cost of capital (expected return) from choosing better quality exceeds the beta-associated increase in cost of capital then the use of non German GAAP has a negative association with cost of capital even though it is positively associated with beta.

2. GAAP as a priced risk factor

Following in the tradition of Fama and French (1992) (Fama-French henceforth) EV examine whether returns on factor portfolios formed on the basis of whether a firm uses German GAAP (G portfolio) or non German GAAP (I or U portfolios). I have two concerns, one conceptual and the other mechanical, with this aspect of the paper analysis.

¹ The problems with the earnings-variability notion are (1) that it presumes a rather mechanical relation between prices and earnings that is broadly inconsistent with information quality having positive cost of capital effects, which is a broad thesis in the paper, and, (2) invites the more directly pertinent but unperformed analysis of the relation between GAAP choice and return variability per se.

2.1. Conceptualizing GAAP as a risk factor

Conceptually, it is not obvious how information works as a fundamental risk factor. Basic decision making under uncertainty tells us that in investment settings information derives value through its ability to reduce uncertainty or risk associated with future payoffs. That is, information derives its value through its ability to lower risk. It does not in and of itself cause risk, and it possesses relevance entirely from its ability to modify pre-existing risk. If we couple this idea that information relevance depends on pre-existent risk factor levels with the notion of factor-driven asset pricing then it readily follows that information derives value in such settings from its ability to impact factor risks. Thus, for example, in a CAPM market return, risk-factor setting, if better information emerges about future expected aggregate market return then investing in the market becomes less risky. Hence, the price paid for the market portfolio increases as risk-adverse investors seek to increase their market holdings and its expected return declines. From the firm side, a decline in expected risk-factor return equates to a decrease in the cost of equity capital. Specifically, in a CAPM a firm's expected return/cost-of-capital is:

$$E(R_{it}) = r_f + b_i * (E(RMKT_t)) - r_j$$

$E(RMKT_t)$ in this expression is determined by a number of exogenous factors including the perceived riskiness (i.e., variance) of undiversifiable, future, aggregate market cash flows. It follows, therefore, that lowering perceived riskiness through the provision of higher quality information lowers $E(RMKT_t)$, consequently lowering expected return cost-of-capital for **all** firms in the market. In efficient market settings information quality matters for equity returns indirectly, through its ability to modify uncertainty about pre-existing risk factors. Moreover, these information impacts flow to all firms in the market in a public-good-like fashion, not simply to those firms that happen to be the source of the information. At the conceptual level information does not, in particular, possess the sort of firm-specific risk factor return impacts envisioned by EV and others such as Francis et al. (2004). Moreover, the appropriate empirical tests of information-quality effects should be applied to the factor returns (e.g., $E(RMKT_t) - r_f$, differential return between high and low book-to-market firms, etc.), not to firm-specific returns which merely reflect these factor-level effects flowing through firm-specific betas.²

2.2. Implementing GAAP as a risk factor

At the mechanical level the problem with the EV empirics is that the same underlying firm returns are determining both the dependent subportfolio returns and the independent GAAP factor portfolio returns. It is hardly surprising that a positive relation exists between

² Information may also impact the degree of estimation error in the factor betas. In Barry and Brown (1985) low information quality raises CAPM beta to a value that is higher than it truly should be, resulting in a higher return (cost of capital). While such a measurement-error impact does link firm-specific information to returns it remains the case that this return effect is entirely dependent on the existence and magnitude of primary return factors. It does not provide a foundation for postulating the existence of a new, distinct, information-quality factor. Rather, it suggests a model in which firm-specific information quality is interacted with factor-portfolio returns.

the return on a portfolio of German GAAP firms and the return on a differently weighted portfolio of these same firms (the Table 10 analysis). The fact that the explanatory GMI and GMU factor-portfolios also involve deducting the return from a portfolio of IAS/IFRS GAAP (GMI factor) or U.S. GAAP (GMU factor) firms may diminish this basic self-correlation, but there is certainly no basis for believing that this differencing eliminates it. Similarly, of course, it is not surprising that significant negative GMI (GMU) coefficients emerge when the dependent variable changes to the portfolio return on the IAS/IFRS GAAP firms, (U.S. GAAP firms) since these portfolio returns negatively impact the GMI and GMU differences.³ Hence, in addition to being conceptually suspect, the findings on priced GAAP risk factors are also empirically suspect.

3. GAAP and cost of capital

In a final series of tables (Tables 12 and beyond), which were not included in the presentation version of the paper, EV report an examination of the relation between a cost-of-capital metric based on asset-pricing-model slope coefficients multiplied by factor returns and accounting-regime choice. The underlying point of such an analysis is unclear. In the case of the CAPM specification this estimation approach can be thought of as:

$$\text{Beta}_{it} * ((\text{RMKT}_t - r_{ft}) + r_{ft} - c_0 + c_1 \text{IAAP}_{it} + c_2 \text{InvMills}_{it} + c_3 \text{LN}_M E_{it} + e_{it})$$

where

IAAP_{it} is one if the firm uses non German GAAP in period *t*;

InvMills is the inverse mills (self-selection) control;

LN_ME is firm market value.

Simple inspection of this expression reveals an obvious misspecification.⁴ Beta influences the left-hand-side dependent-variable value, but is omitted from the right-hand-side explanatory-variable set. Since beta is correlated with IAAP (Table 7) this omission necessarily leads to spurious IAAP inferences. Indeed, since RMKT is smaller than r_{ft} for the bulk of the observations within the time period considered in the paper the documented negative IAAP coefficient can be directly attributed to the omission of beta as an explanatory variable in the analysis. That is, on the left hand side beta is being multiplied by a negative number ($\text{RMKT} - r_{ft}$) more frequently than it is being multiplied by a positive number and so the left-hand side is smaller when beta is higher. Since IAAP is positively correlated with beta

³ More generally, an economically meaningful factor **must** have an average coefficient across all firms of something other than zero since otherwise the factor's overall average impact on return is zero and it essentially disappears within any diversified portfolio. Casual inspection of the Table 10 GMI and GMU coefficients reveals an overall pattern of equally dispersed positive and negative GMI and GMU coefficients. Hence, it seems likely that their overall averages, properly weighted of course, are indistinguishable from zero.

⁴ The presence of the common cross-sectional constant risk-free rate adjustment is also problematic as it implies the risk-free rate component of cost of capital is somehow related to accounting-regime choice

(per the paper's previous analyses) it picks up this beta effect as a negative estimated c_1 coefficient. Further confirmation of this beta-effect is seen in the by-time-period (hypothesis 2) analyses reported in Table 15. The estimated IAAP coefficient is positive in the 1998 to 1999 time period, negative in the 2000 to 2001 time period, and ambiguous in the 2002 to 2004 time period. Respective market returns in these time periods are highly positive, negative, and mixed in these three time periods. That is, the estimated IAAP coefficient responds to market-return conditions in a manner consistent with how beta impacts the dependent "cost-of-capital" return.⁵ In regard to what the paper is attempting here in terms of measuring cost-of-capital effects of financial reporting regime choice, I think it suffers from a failing to think about the problem intuitively. The straightforward proposition here is that information quality lowers return (cost of capital) *per se*. This proposition follows from the implicit assumption that factor-based pricing effects represent an inherently incomplete representation of asset prices and that investors, particularly those holding undiversified portfolios, value the risk reduction provided from improved information. This risk-reduction value shows up as an increase in demand for the firm's stock which in turn drives up stock price, thus lowering return/cost-of-capital. Moreover, such a conceptual information quality of asset pricing is supported by various rational-expectations models of financial markets such as Easley and O'Hara (2004).⁶ The question, then, is what are the most obvious empirical implications of such a relation? They are, I think, that after controlling for other known determinates of cross-sectional and intertemporal cost of capital rates, negative relations should exist between cost of capital and measures of a firm's idiosyncratic information quality. That is, the paper should be estimating whether the IAAP variable is significant in a regression where return less the risk-free rate is the dependent variable and various known factor returns are the independent variables. Self-selection effects such as those I propose in Section 1 of this discussion would be controlled/tested by insertion of the inverse Mills ratio into this equation.

4. Conclusion

In my conference discussion of Ernstberger and Vogler (2008-this issue) I also focused on the importance of recognizing the interplay between investor use of portfolio diversification as a means of minimizing idiosyncratic portfolio risk and notions that information quality is priced. In considering the possible price relevance of information quality it is particularly important to clearly identify what level of aggregation the information pertains to. I use the term macro-information with respect to information about aggregate economy-wide determinates of market discount rates and cash flows. I use the term micro-information to identify information that is specific to the idiosyncratic

⁵ It is also important to recognize that expected market return **must** exceed the risk-free rate in all time periods. Hence, the overall negative relation documented in Table 15 is almost certainly an artifact of deviation between expected market return (which determines expected cost of capital) and its empirical proxy, realized market return.

⁶ See Cready (2007) for a comprehensive discussion of asset pricing in rational-expectations settings.

performance of a firm. The existing accounting literature on the role of information in equity valuation, including cost of capital studies such as EV, focuses almost exclusively on the micro-information setting. Analytical models in which micro-information quality matters in equity market valuation commonly either implicitly or explicitly assume that investors, at best, incompletely diversify.⁷ Hence, investors bear idiosyncratic risk and, consequently, this risk is priced and information that reduces it is valued. Recognizing this fundamental linkage between diversification and micro-information value is critically important in executing coherent empirical tests aimed at establishing a linkage between information quality and equity return (cost of capital). If, for instance, investors do not hold idiosyncratic risk minimizing diversified portfolios then Fama-French factor pricing is, at best, an incomplete foundation for understanding asset pricing since it depends on the formation by investors of risk-minimized factor portfolios. And, it certainly makes no sense whatsoever as a basis for understanding micro-information quality price impacts since the conceptual existence of such effects depends quite directly on their being determined in a nonarbitrage fashion as efficient arbitrage requires efficient diversification which, by assumption, does not happen in priced micro-information-quality settings.⁸

In addition to steering empirical designs away from taking a Fama-French factor-pricing approach in evaluating information quality equity pricing issues, the inherent linkage between diversification and micro-information price relevance also provides insights into how to condition empirical analyses in meaningful ways. Specifically, if the shareholder clientele of a firm consists largely of highly diversified portfolio holders, then it seems unlikely that information quality will have much impact on price. Micro-information quality is irrelevant to such investors.⁹ Hence, studies aimed at establishing micro-information quality price impacts should target firms with relatively undiversified shareholder clienteles.

Price is typically also determined by (weighted) average rather than best beliefs in these models (see Cready, 2007).

* Unlike micro information quality, macro-information quality can matter in the Fama-French setting, but not as a separate factor. Rather, it would show up as a determinant of the expected factor returns. That is, factor returns are determined in part by their expected variation. An increase in macro-information quality lowers perceived variation and hence decreases the equilibrium expected return paid on the factor portfolio. That is, macro-information quality improvements should reduce expected returns of factor portfolios. Hence, existing evidence of a priced information-quality factor (e.g., Francis et al., 2004) most likely reflects correlations between the information-quality metric and either measurement error in included factors or omitted factors.

Many of the readers of this paper hold sizable investments in CREF (College Retirement Equity Fund) and are, therefore, in a position to provide a quick self-test of this proposition. Do you care about the information quality of the equities in which CREF is invested in determining the size of your investment in CREF? For that matter, do you know anything about CREF's specific equity holdings? If your answers to these questions are "no" (or, if you can only give my answers to them), then you aptly illustrate the reasonable attitude of a truly diversified investor toward the information-quality composition of his or her portfolio. Of course, you most likely should care about the quality of CREF's reporting (as in, is it a "Ponzi" scheme?) and the degree of uncertainty about the expected returns on the S&P 500 or the Dow Jones Industrial Index.

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Reply

Reply to the discussion of “Analyzing the German Accounting Triad — ‘Accounting Premium’ for IAS/IFRS and U.S. GAAP Vis-à-vis German GAAP?”[☆]

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1. Introduction

In his discussion, William M. Cready (the discussant) makes general comments about the research pertaining to the pricing of information risk and raises issues concerning the methodological approach we follow. We appreciate the detailed comments the discussant provides, and address his main concerns with this reply.

To make it valuable for the reader, we do not try to comment on each single point the discussant has raised individually and consecutively. Rather, we structure our response to first address concerns regarding GAAP as a priced risk factor per se, and, second, to elaborate on the specific methodological setup in Ernstberger and Vogler (2008).

2. GAAP as a priced risk factor

One fundamental concern of the discussant is whether conceptually information works as a risk factor in multi-factor models. However, this concern does not address our paper solely, but refers to a huge stream of recent literature on (accounting) information as a

We are grateful to the participants of the Annual Congress of the European Accounting Association 2008 in Rotterdam, especially the discussant Ann Gaeremynck, for further comments and suggestions. Moreover, we thank the organizing committee of this conference for granting us the Best Paper Award in the category “International Financial Accounting” for this paper.

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priced risk factor. Both analytical and empirical papers show that firm-specific information risk cannot be diversified away completely and thus is priced and has an impact on the cost of equity capital.²

To mention one of the most influential analytical papers on that topic, Easley and O'Hara (2004) investigate a multi-asset, multi-period setting with informed and uninformed investors. They show that the information risk of the uninformed investors cannot be diversified away and is therefore priced. In their model, uninformed investors' risk of holding the stock is increased by relatively more private information. The reason for this is that the privately informed investors are better able to adjust their portfolio of stocks to take advantage of new information. As uninformed investors thus face a form of systematic (i.e., undiversifiable) information risk, they will require higher returns. Therefore, information risk in terms of higher levels of private information and lower levels of precision of the information (both private and public) is found to increase the cost of equity capital.

In another and more accounting-driven research setup, Lambert, Leuz, and Verrecchia (2007) argue that low-quality performance reports which are designed to align investors and firms with respect to capital investments negatively affect the coordination between investors and firms and create information risk. As investors anticipate this impact they demand a higher risk premium and thus a higher cost of equity capital from firms providing such performance reports of low quality. Lambert et al. (2007) also show that a portion of the information risk cannot be diversified away even in economies with many firms.

In short, both Easley and O'Hara (2004) and Lambert et al. (2007) imply that information risk concerns the uncertainty or imprecision of information used by investors to price securities. Thus, the results of both studies predict a negative association between information risk and costs of equity capital.

Empirically, Francis, LaFond, Olsson, and Schipper (2004, 2005) use a research design which is very similar to ours. They augment the Fama and French (1993) model with either earnings quality measures (Francis et al., 2004) or an accrual quality (AQ) factor (Francis et al., 2005) to estimate asset-pricing regressions. Francis et al. (2004) find that an inverse relationship exists between earnings attributes and the cost of capital. Moreover, firms with poor accruals quality have higher cost of equity capital and, thus, accruals quality proxies for an information risk factor that cannot be diversified away (Francis et al., 2005).

The main difference between our study and these earlier works cited is that they focus on accounting measures reported under the same accounting regime, i.e., U.S. GAAP, while our study focuses directly on the impact of applying different GAAP regimes. Altogether, their empirical work strongly suggests the feasibility of adding an (accounting based) information risk factor to a multi-factor analysis.

3. Methodological setup in Ernstberger and Vogler (2008)

The discussant criticizes the empirical specification of our analyses and doubts whether the accounting regime factors we use are economically meaningful. As a matter of fact,

² Habib (2006) provides an excellent review of literature on information risk and cost of capital, highlighting the general notion that increased information should reduce the cost of capital and that this form of risk cannot be diversified away.

however, we find that in most cases these factors are significant in our regressions and are able to increase the explanatory power of the models considerably.

To recap the development of multi-factor models, it seems worth mentioning that in their influential paper Fama and French (1993) rather heuristically built their SMB and HML factors for explaining portfolio returns. The technical split into three and two groups, respectively, is “arbitrary,” as they admit (Fama & French, 1993, p. 9). The central point, in fact, is that they build upon strong empirical evidence for modeling these anomalies (found in Fama & French, 1992) into their three-factor model. This proceeding applies also to other multifactor models that are supposed to overcome empirical anomalies, for example, the momentum factor (Carhart, 1997) or the models by Francis et al. (2004, 2005).

In a similar vein, we explicitly provide empirical evidence for including our accounting regime factors into the analyses. The GMI and GMU factors represent the differences in returns between companies applying German GAAP and IAS IFRS (GMI factor) or between companies applying German GAAP and U.S. GAAP (GMU factor). As already stated above, these additional factors proxy for the quality of accounting information and for the level of disclosures provided to investors by companies applying different accounting regimes. By doing so we control for another type of anomaly, called the “accounting premium” in our paper.

Moreover, the discussant states that he does not understand the rationale of the final analyses of the paper. Here we derive the cost of equity capital estimates for the 18 portfolios defined by the CAPM and the GM model (beta, size, and market-to-book value, as well as the accounting regime factors GMI and GMU). Calculating the market value weighted mean of the German GAAP, IAS IFRS and U.S. GAAP portfolios using the CAPM we find that the application of Internationally Accepted Accounting Principles (IAAP) reveals higher expected returns and thus lower cost of equity capital in comparison to German GAAP. In contrast, using our new GM model we find that the differences are not significant because it already accounts for GAAP differences. In firm-level analyses we provide evidence that our results are robust to self-selection issues but vary over time.

Furthermore, the discussant claims that our firm-level analyses were misspecified and could lead to a potential omitted variable bias. However, the discussant assumes that beta exists for each firm and each point in time, i.e., varies with firm and time. In fact, we dispose only of one estimated beta per firm over the examined time period (since beta has to be pre-estimated somehow, using up the time dimension of the data). Consequently, beta is constant over time and cannot explain the variation of cost of equity capital. If we add beta on the right-hand side, as the discussant suggests, we obtain a kind of fixed-effects model, instead of gaining another right-hand side variable. In other words, beta cannot be correlated over time with any of the other variables, since it is constant.

Still, we estimate the suggested new model with beta on the right-hand side. As expected, adding beta does not help to explain the cost of equity capital more appropriately. In six out of the eight equations estimated in Tables 15 and 16 of the paper, beta is mostly highly insignificant with *p*-values ranging from 0.12 up to 0.92. Simultaneously, inference on the IAAP factor improves towards our first results, since IAAP helps to explain cost of equity capital estimated upon the CAPM and that IAAP is no longer an explanatory factor, when turning to the (in terms of explanatory power superior) GM model.

4. Conclusion

We thank the discussant for his extensive review of our paper and providing another viewpoint on this subject of analysis. While his discussion (especially his oral discussion at the conference) seems to stem largely from the “pure CAPM school,” we tie our analysis and findings to more recent findings in accounting literature, where not only multi-factor analysis but also information risk is a specific matter of research. Both our paper and the discussion show that the relationship between information quality and the cost of equity capital remains a fruitful avenue for future research.

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Industry upheaval and valuation: Empirical evidence from the international oil and gas industry

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Abstract

Accounting literature suggests that contemporaneous earnings are more useful than current operating cash flow in predicting future cash flows and, therefore, also more relevant for company valuation. However, recent research indicates that elevated levels of merger and acquisition activity or a changing economic environment may reduce the value relevance of earnings. Using the oil and gas industry as a case, this paper examines how the oil industry upheaval in the late 1990s influenced the value relevance of financial statement information. We extend the literature by testing for a structural shift in the equity market valuation process. Our results provide evidence of a structural break in the value relevance of accounting information. In contrast to prior research, we find that the value relevance of cash flows actually decreased in the recent oil industry upheaval. On the other hand, the value relevance of book equity increased. Furthermore, we find that accounting-method choice (full cost versus successful efforts) affects the value relevance of accounting information.

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1. Introduction

An important role of accounting information is to assist in the forecasting of future cash flows (Lev, 1989). Financial analysts and investors regularly use financial statements for

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this purpose. The relation between accounting information and market valuation, therefore, represents vital knowledge for analysts and investors, especially under conditions of uncertainty regarding the quality of accounting information.

While prior studies imply that accounting earnings are more value-relevant than operating cash flow (Dechow, 1994; Biddle, Seow, & Siegel, 1995; Rayburn, 1986; Sloan, 1996), this may not be the case over the whole life cycle of the firm (Black, 1998). Furthermore, the literature suggests that the value relevance of accounting information is influenced by industry restructuring and M&A activity (Christian & Jones, 2004) and changing economic conditions, such as the Asian financial crisis (Davis-Friday, Eng, & Liu, 2006). Accordingly, structural changes in a company's economic environment can lead to increased uncertainty in investors' perceptions of the quality of reported earnings. Therefore, market participants tend to rely more on cash-flow measures, which are less clouded by measurement errors than accruals. The focus of this paper is to investigate the impact of structural changes on the value relevance of financial-statement information. To this end, the recent upheaval in the oil and gas industry, 1998–2002, serves as an appropriate case study.

Given the importance of the international oil industry, we find a targeted industry study appropriate. According to Quirin, Berry, and O'Bryan (2000), cross-sectional studies that include observations from many different industries are problematic for several reasons. Since any given industry has specialized accounting methods, regulations, and taxation it is difficult to generalize the results (Shevlin, 1996). Furthermore, industry-specific analysis allows consideration of the economic context of reported accounting information (Bernard & Stober, 1989; Lev & Thiagarajan, 1993). Hence, by focusing on the oil and gas industry, we are able to assess the value relevance of industry-specific events, such as an industry upheaval.

We contribute to the capital-markets literature by examining whether an upheaval in the oil and gas industry has instigated a structural shift in the relationship between financial-statement information and market valuation. Using data from 1992–2005 for 114 oil and gas companies, we regress market value of equity (MVE) on accounting information. Using the dummy-variable approach (Gujarati, 1970a,b) we assess whether a structural shift in value relevance has occurred and, by testing recursively for this shift, we can determine when it took place.

Our results confirm that a structural break took place in the valuation of oil and gas companies in the late 1990s. We find an increase in the value relevance of book equity and a decrease in the value relevance of net income and cash flows during the industry restructuring, which is contrary to findings in recent studies.

Previous studies have largely concentrated on U.S. companies whose primary business involves exploration, development, and production (E&P) of oil and gas (e.g., Quirin, Berry, & O'Bryan, 2000; Berry & Wright, 2001; Bryant, 2003). Our study examines both integrated and exploration and production oil and gas companies in the United States and abroad. Studies of the value relevance of accounting information from US E&P companies typically consider a large number of companies for periods of two to four years (e.g., Quirin et al., 2000; Berry & Wright, 2001; Bryant, 2003). Our data set (1992 to 2005) allows us to investigate market and company behavior over a period of 14 years, covering at least one full oil-price cycle, which provides additional information for the time-series analysis. Our data set has the additional advantage of covering the recent period of substantial industry restructuring, which very few studies have examined.

This study provides new insights into how financial and operational information relate to the market valuation of both upstream and integrated international oil and gas companies during a period of industry upheaval, which is particularly useful in the application of accounting-based valuation models. Our findings should be of interest to oil companies, equity analysts, oil and gas investors, and financial-market regulators.

The remainder of the paper is organized as follows. Section 2 presents a review of the extant literature. A description of the events of the industry upheaval is presented in Section 3. Section 4 outlines the research design and provides empirical specification of the regression models. Section 5 describes the data set. Section 6 contains the empirical results and a discussion of the results. Section 7 concludes the paper.

2. Literature review

An important aspect of financial statements and particularly earnings is to assist users of the financial statements in predicting future cash flows (Lev, 1989), thus facilitating fundamental valuation analysis. This view implies that earnings quality¹ is an important factor to consider when analyzing the relation between market valuation and accounting earnings. The Financial Accounting Standards Board (FASB) Statement of Financial Accounting Concepts No.1 states that:

“information about enterprise earnings and its components measured by accrual accounting generally provides a better indication of enterprise performance than does information about current cash receipts and payments.” FASB (1978).

Indeed, results from prior studies imply that earnings are more value relevant than operating cash flow (Dechow, 1994; Biddle et al., 1995; Rayburn, 1986; Sloan, 1996).

Nevertheless, the view that earnings are superior to operating cash flow has recently been contested by researchers who claim that the earnings quality has actually decreased in recent years (Francis & Schipper, 1999; Bradshaw & Sloan, 2002; Hodge, 2003). The accounting scandals of the beginning of this millennium highlight the potential failures of GAAP and financial disclosures (Penman, 2003).

Furthermore, the empirical literature suggests that the higher value relevance of earnings compared to cash flow might be influenced by a number of external factors such as industry affiliation, stage in life cycle, and merger activity. These external factors and events may reduce the quality of earnings, thereby hampering analysts' and investors' ability to forecast cash flows. Ultimately, this would also reduce the value relevance of earnings.

2.1 *Industry affiliations and the value relevance of accounting information*

The value relevance of earnings and book equity may vary across industries (see e.g. Biddle et al., 1995; Aharony, Falk, & Yehuda, 2003). For instance, the value relevance of earnings has been found to be lower than that of cash flows in the oil and gas industry (Quinn et al., 2000; Cormier & Magnan, 2002). In fact, the dominating view among

See, e.g., Schipper and Vincent (2003) for a discussion on the concept of earnings quality

financial accounting standards setters has been that historical cost accounting² is inappropriate for accurately conveying the oil and gas companies' financial performance to the financial markets, as underscored by the Financial Accounting Standards Board (FASB):

“An important quality of information that is useful in making rational investment, credit, and similar decisions is its predictive value, specifically its usefulness in assessing the amounts, timing, and uncertainty of prospective net cash inflows to the enterprise. Historical cost based financial statements for oil and gas producing enterprises have limited predictive value. Their usefulness is further reduced because a uniform accounting method is not required to be used for costs incurred in oil and gas producing activities.” FASB (1982).

There are several reasons for the lack of confidence in historical cost accounting in the oil and gas industry. According to Wright and Gallun (2005), upstream oil and gas exploration and production embody certain characteristics that distinguish them from other operations involving asset acquisition and use, characteristics which are frequently cited as the primary factors responsible for the development of different accounting practices in the oil and gas industry:

1. Risks are high and the probability of discovering commercial reserves is often low.
2. There is often a long time lag between acquiring permits and licenses and the ultimate production of reserves.
3. There is not always a correlation between expenditures and results.³
4. The underlying value of the reserves (which represents a major component of the economic worth of a company) cannot be valued reliably enough to be recorded on the balance sheet.
5. The discovery of new reserves, which cannot be valued reliably enough to be recorded as income, is a major future income-earning event.
6. High costs and risks often result in joint operations.

In particular, the existence of multiple accounting methods in the oil and gas sector may reduce the value relevance of accounting information. Companies whose primary business is exploration, development, and production of oil and gas, can choose between two competing accounting methods; either the full-cost method (FC) or the successful-efforts method (SE).⁴ The SE method will, for a specific exploration project, potentially result in

² In this paper, the reference to historical cost accounting relates to the accounting for oil and gas activities, e.g., the full-cost vs. the successful-efforts method. Many oil firms use the LIFO inventory method, which cannot be seen as historical cost based.

³ For the oil majors, for instance, the expenditure of one location will be offset by the revenues of another. Similarly, these companies have portfolios of projects with different time lags. They can be considered as classic examples of “going concerns.”

⁴ Under the FC method all costs incurred from exploration and development activities are capitalized and subsequently amortized according to the unit-of-production depreciation method. The SE method, on the other hand, allows only costs incurred from successful exploration activities to be capitalized, and subsequently amortized according to the unit-of-production depreciation method.

lower initial net income, and higher future net income as compared to the FC method.⁵ Thus, two different accounting methods lead to different values for net income and book equity, making it difficult for users of accounting information to determine the financial performance of oil and gas companies. In order to minimize the potential influence of measurement errors due to the existence of multiple accounting methods, we only analyze companies using the successful-efforts method.

Other accounting methods such as the unit-of-production depreciation method⁶ may also result in measurement errors that may affect the reliability of accounting figures. The idea behind the unit-of-production depreciation method is that the costs incurred from exploration activities are matched with the revenues from production (i.e., in line with the Matching Principle). However, this method typically results in too rapid depreciation of oil and gas assets, resulting in so-called legacy assets (Antill & Amott, 2002). Legacy assets are defined as oil and gas assets that still generate cash flows, but are absent from balance sheets.

In order to compensate for the deficiencies in accounting data, as stated for instance by the FASB, oil companies were required to disclose supplementary information from oil and gas activities. The ruling oil and gas accounting standard, the SFAS No. 69 (FASB, 1982), describes the type of information that oil companies are required to disclose, which include costs incurred, capitalized costs, reserve quantities, changes in reserves quantities (including production), and a fair-value estimate of the oil and gas reserves (the standardized measure of discounted cash flows).⁷

In conclusion, the literature suggests that the value relevance of financial statement information is affected by industry affiliation. This may especially be the case in the petroleum industry, where unique characteristics and particular accounting methods can lead to measurement errors that can reduce the quality of earnings. The implication may well be higher value relevance of cash flows than accruals.

2.2. *Merger waves and the value relevance of accounting information*

The value relevance of earnings may also be affected by merger activity. Several analyses indicate that mergers lead to a significant reduction in the merging firm's accounting profitability compared to a control sample of firms from various industries (Bild, 1998; Caves, 1989; Scherer & Ross, 1990).⁸ An explanation is that merger activity is expensive and results in the firms incurring substantial costs and nonrecurring items, which reduce profitability. Research suggests that negative earnings and nonrecurring items can unfavorably affect the

⁵ See Bryant (2003) for a discussion on the value relevance of SE vs FC accounting.

⁶ The unit-of production method for amortization of capitalized exploration costs differs somewhat under the full cost and successful-efforts accounting methods (see, e.g., Jennings, Feiten, and Broek, 2000; Wright and Gallun, 2005). Under the unit-of production method, oil and gas assets are depreciated according to the ratio of production of oil and gas to the balance of total reserves in the beginning of the year (calculated as the year-end balance minus the year's production).

⁷ See e.g., Dechow, Paxon, and Rizzuto (1996) on the historical debate regarding use of accounting versus economic data in valuing oil firms.

⁸ Fama and French (2005) propose a theory of pre-emptive mergers to explain the empirical puzzle that mergers often reduce profits, but raise share prices.

value relevance of earnings (Basu, 1997; Elliott & Hanna, 1996; Hayn, 1995). Furthermore, the existence of two separate methods for accounting for mergers may further exacerbate valuation uncertainty through reduced earnings quality (FASB, 1999). Prior to 2001, merging companies could choose to account for a merger using either the pooling-of-interest method or the purchasing method. Unlike the purchasing method, the pooling method does not require companies to record the premium paid for the transaction, nor to report the acquired assets at fair-market value. Consequently, pooling firms avoided increased future amortization and depreciation, which affected future earnings. The result is that earnings and book equity will be different depending on choice of accounting method. This may lead to a lower reliance on accruals than on cash flows. In fact, Christian and Jones (2004) provide evidence that choice of accounting method for mergers influences the value relevance of accounting data. They find that in the year of a merger, cash flow from operations provides value relevant information beyond earnings, supporting the hypothesis that earnings in the year of the merger are difficult to interpret. The FASB has recently decided to eliminate the pooling-of-interest method and implement a purchase method where goodwill is not amortized but reviewed annually for impairment (SFAS No 141 (FASB, 2001a) and SFAS No 142 (FASB, 2001b)). However, Christian and Jones (2004) assert that this will not resolve the valuation problems with mergers since the exclusion of the acquired firm's earnings from the beginning of the fiscal year to the effective date of the merger will still complicate the merged company's earnings stream.

2.3. Changing economic conditions (financial crisis) and the value relevance of accounting information

The impact of a firms' financial health on the value relevance of book equity and earnings is investigated by Barth, Beaver, and Landsman (1998). The authors argue that companies' liquidation values and value of unrecognized net assets are reflected in the book equity and net income, respectively. They posit that as the financial health of a firm deteriorates, the liquidation value will dominate the unrecognized net-assets valuation effects. In effect, the value relevance of book equity will increase and that of net income will decrease in economic environments that reduce the financial health of the firm. Their results support these arguments and suggest that a structural shift has occurred.

Davis-Friday et al. (2006) extend the Barth's et al. study of bankrupt firms to a setting where firms are operating in a financial crisis. Using the Asian financial crisis as a case study, they find evidence to support prior research in some of the countries they examine.

A general result from the extant literature is that economic conditions that lead to economic distress will tend to suppress the value relevance of earnings and support the role of book equity. During 1997–1998 the price of oil fell dramatically, reducing the profitability of oil companies considerably. We investigate whether the results from Barth's et al. (1998) and Davis-Friday's et al. (2006) analyses extend to a setting where there is a significant decline in the price of output, in this case oil, resulting in industry restructuring with implications for how cash flow and accrual information relate to market value.

To conclude, while many prior studies have indicated that earnings are more value-relevant than cash flows, recent studies indicate that the value relevance of earnings might be affected by industry affiliation, life-cycle stage, restructuring and changing economic

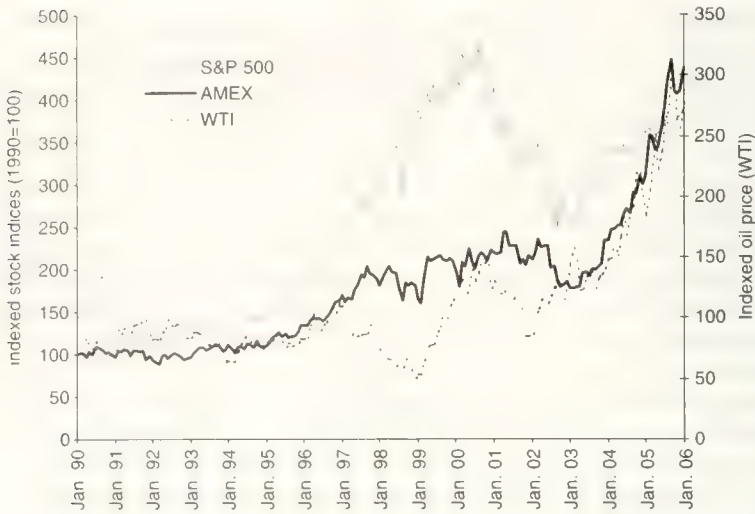


Fig. 1 Development in the S&P 500, AMEX Oil Company indices, and the West Texas Intermediate crude spot price, 1990–2006. Both stock indices and nominal oil price are set to 100 as of January 1, 1990. The S&P 500 Index consists of the 500 largest industrial companies listed on the New York Stock Exchange, including several oil and gas companies. The Amex Oil index consists of the following 13 oil and gas companies: Amerada Hess, BP, ConocoPhillips, Chevron, Kerr McGee, Marathon, Occidental, Repsol YPF, Sunoco, Total, Valero Energy, and Exxon Mobil. Source: finance.yahoo.com. The spot prices for oil (USD/barrel, nominal prices) of the West Texas Intermediate (WTI) quality are taken from www.eia.doe.org.

conditions—events that are highly relevant in an analysis of the how the valuation of oil and gas majors was influenced by the oil industry upheaval in 1998–2002.

3. The oil and gas industry upheaval 1998–2002

Commentators and researchers have set forth several reasons explaining the massive industry restructuring that occurred in the international oil and gas industry from 1998–2002. First, shareholder returns lagged substantially behind the general market development prior to 1998 (Fig. 1). In fact, while share prices in general⁹ tripled during this period, oil company shares¹⁰ only grew by 80%.

Second, oil prices fell dramatically in 1998 and 1999, reaching \$10 a barrel (Fig. 1), severely affecting oil company profitability. This led *The Economist* to predict that the oil price would remain low for the foreseeable future, even as low as \$5 a barrel (The Economist, 1999). Osmundsen et al. (2006, 2007) argue that the temporary financial distress led to a stronger focus on cost discipline and short-term profitability across the oil and gas industry.

Third, the availability of exploration projects in OECD was shrinking, making it necessary to search for petroleum reserves in other parts of the world (Weston, Johnson, & Siu, 1999), in regions where the geopolitical risks are greater.

⁹ As measured by the development in the S&P 500.

¹⁰ As measured by the development in the AMEX index of oil and gas companies.

Fourth, the relatively low value of oil shares made acquisition costs for reserves lower than expected finding and development costs (Antill & Arnott, 2002; Weston et al., 1999).

Clearly, the major oil and gas companies did not view the inferior share price development as satisfactory. At the same time, oil companies witnessed increasing pressures from investors and the analyst community to set and meet aggressive targets both for profitability (e.g. RoACE)¹¹ and production growth (Wilson, 2002). The result was a wave of merger and acquisition activities among the largest oil and gas companies. Starting with the announcement of a merger between BP and Amoco in August 1998, several others followed including Exxon/Mobil, Total/Elf/Fina, Chevron/Texaco, BP-Amoco/Arco, and lastly, Conoco/Phillips in November 2001. Royal Dutch/Shell took a different route, by acquiring companies instead of growing through mega-mergers.

The merger activity was surpassed by announcements of cost cutting and share repurchases. It is likely that this period of merger activity, cost-cutting programs and volatile oil prices may have influenced investors' and analysts' ability to use financial statement to forecast future cash flows (fundamental analysis).

In the remainder of the paper we set the start of the upheaval period to 2000. This is based on an iterative process where we varied the year for the start of the upheaval period. Starting with 2005 and working backwards, we find evidence that 2000 was the year the structural break occurred (see Section 6.1 for more details on this procedure). Consequently, we analyze the value relevance of accounting and operational information pre and post by dividing our data set into two sub-samples, one for the years 1992–1999 and one for the years 2000–2005.

4. Research design and econometric specification

4.1. *The value relevance of accounting information*

Following Ball and Brown's (1968) and Beaver's (1968) seminal works on the topic, researchers have tried to determine the relationship between accounting figures and valuation using statistical methods. However, until Feltham and Ohlson's revitalization of the residual income valuation model, RIV (Ohlson, 1995, 1999; Feltham & Ohlson, 1995, 1996),¹² the research framework lacked a formal theoretical model that could link accounting figures to valuation. The Feltham–Ohlson model enabled a better understanding of how accounting information formally could be linked to valuation. By connecting market value to the fundamentals, i.e., earnings and book value of equity, this method has inspired a considerable amount of capital-markets research (see e.g. Kothari, 2001). Value relevance is an adequate conventional research tool that aims to uncover how contemporaneous accounting figures, such as earnings, are linked to market valuation of shareholders' equity (see, e.g., Barth, Beaver, & Landsman, 2001; Amir, 1993).

¹¹ Return on Average Capital Employed (RoACE) is a commonly used measure of profitability in the oil and gas industry (see, e.g., Osmundsen et al., 2006, 2007).

¹² Ota (2002) provides a review of the Ohlson and Feltham–Ohlson models.

Based on the dividend discount model, Ohlson (1995) develops a model that describes how the market value of firm i (MVE_{it}) is related to book value (BV_{it}), abnormal earnings (NI_{it}^a), and other information:¹³

$$MVE_{it} = BV_{it} + a_1 NI_{it}^a + a_2 v_{it}, \quad (1)$$

where v_{it} represents other value relevant information. According to Ohlson (1995), other information represents “value-relevant events that have yet to have an impact on the financial statements.”

4.2. Econometric issues

Due to the linearity of the expression, Eq. (1) has extensively been used in value relevance studies. However, several review articles point out some potential issues related to econometric modelling of the Ohlson model (Holthausen and Watts, 2001; Barth et al., 2001; Kothari, 2001).

Among these issues are scale and omitted variables. Also, the choice of proxies for “other information,” and their potential impact on statistical inference need to be considered when carrying out value relevance studies.

4.2.1. Scale

The purpose of value relevance studies is to examine the relationship between a firm's market values and a set of accounting numbers in order to assess the accounting variables' usefulness in equity valuation. Based on the Ohlson (1995) model, two types of regression models are commonly used, the levels model and the return model. The levels method investigates the relation between firm market value and earnings and book value of equity. The alternative method, the returns model, examines the relation between stock returns, earnings, and changes in earnings. Although both models are derived from the same theoretical model, the Ohlson (1995) model, different results are sometimes obtained when comparing the models (Ota, 2003; Harris, Lang, & Möller, 1994). In particular, scale effects are of relevance to the levels model. Scale effects are defined as a spurious relation in the levels model regression that can be caused by failing to control for scale effects that presumably exist among firms (Ota, 2003). Scale might lead to inference problems such as coefficient bias, R^2 bias, and heteroscedasticity (Easton & Sommers, 2003).

The literature has suggested alternative approaches to mitigating the effects of scale in capital-markets research, including scale-related variables on the right hand side of the equation (Barth & Kallapur, 1996), deflating the variables by scale-related variables (scale proxy), such as the number of shares outstanding, book value of equity, sales, total assets, and lagged market value (opening market value), (see, e.g., Christie, 1987; Brown, Lo, & Lys, 1999; Lo, 2004) – or, by deflating by the dependent variable (Easton, 1998; Easton & Sommers, 2003).

Lo (2004) argues that the R^2 bias and heteroscedasticity can be mitigated by deflation, and that any residual heteroscedasticity can be corrected by, e.g., White's (1980) adjustment

¹³ This model holds under the assumptions of the clean surplus property and certain time-series properties (see Ohlson, 1995).

to standard errors. However, the literature has not come to a conclusion on which deflator is preferable. Lo (2004) finds that deflation by a scale proxy is the preferred solution. Easton and Sommers (2003) on the other hand, advocate the use of the dependent variable. Lo and Lys (2000) argue that the opening market value is the best deflator on a theoretical basis. Recently, Barth and Clinch (2005) find that the number of outstanding shares is the most effective deflator. However, this result contradicts Akbar and Stark's (2003) finding that the use of the number of shares as the deflator does not appear to be effective in either removing scale effects or heteroscedasticity in U.K. data. Hence, effective mitigation of spurious scale effects remains an unresolved question in capital markets accounting research.

In this paper we deflate variables using lagged market values. In addition, we use the GLS method which corrects for both heteroscedasticity and serial correlation (see Clarkson, Li, & Richardson, 2004).

4.2.2. Omitted variables

A potential problem in estimating Eq. (1) is that variables that are correlated with the dependent variable are left out because they are not consistent with the theoretical model. This may result in the omitted variables bias, where the error term becomes correlated with the dependent variable, and may result in inefficient estimates for the explained variables.

To avoid the omitted variable bias we include variables that are documented to be important in explaining the value of oil and gas companies. We have included variables for the oil price along with variables indicated by a previous study, Quirin et al. (2000). In the latter study, the following variables were identified as significant value-relevant variables:

Variable	Definition
Margin per BOE (MAR)	Total annual revenues from oil and gas operations minus total production costs/boe production; where total production costs are defined as the sum of (1) costs to operate oil and gas properties, (2) state production taxes, and (3) windfall profits taxes
Finding costs per BOE (FCB)	Two-year average fully loaded finding costs per BOE production
Reserve replacement efficiency (RRE)	Discretionary cash flow ^a per boe production/two-year average fully loaded finding costs per boe production
Enterprise value/EBITDA ratio (EV/EBITDA), lagged (previous year's ratio)	Total book value of debt plus market value of common equity/earnings before interest, taxes and DD&A expense
Growth of reserves (SGR)	Current year-end equivalent reserves minus previous year-end equivalent reserves
Growth of production (SGP)	Current year-end equivalent production minus previous year-end total equivalent production

^a Discretionary cash flow is defined as earnings before extraordinary items plus annual DD&A expense, deferred taxes, and exploration expenses.

We considered using the oil price as an explanatory variable, but this variable was strongly correlated with MAR (correlation > 0.80).¹⁴ On the other hand, the change in oil price was not

¹⁴ Oil and gas price can include important information on energy growth rates in India and China. For many commentators this has been one of the most important driving forces behind the oil-price hike in the recent five years. We do not model the energy growth rates in India and China separately, as we believe they are implicitly included in the oil price, and, therefore, also included in the profit measures, for instance margin per BOE

particularly correlated with the change in margin per boe, and the former variable was therefore used in the returns specifications.

We also include the end-of-year price-to-book ratio for the S&P500 (P/B) in our estimation.

4.2.3. Other information

The variable v_t represents information other than abnormal earnings that has yet to be captured in current financial statements but affects future abnormal earnings. As Ota (2002) points out, despite v_t playing an integral role in the Ohlson (1995) model, it is often unobservable or very difficult to observe because of its inherent properties. Several attempts have been made to specify v_t using different accounting variables (Barth et al., 1999; Dechow, Hutton, & Sloan, 1999; Hand & Landsman, 1998, 2005; Myers, 1999). In a similar study to ours, Bryant (2003) uses the net present value of oil and gas reserves as a proxy for other information. We use the amounts of oil and gas reserves, OGR, (in barrels of oil equivalents, boe) in the levels regressions. Changes in oil and gas reserves are captured by the SGR variable.

The Ohlson (1995) model assumes that v_t follows a first-order autoregressive process, AR(1). According to Ota (2002), omitting this AR(1) variable from regression models will lead to serial correlation in the regression error terms. Ota (2002) suggests the use of generalized least squares (GLS) to mitigate the problem of serial correlation.

The pooled GLS technique allows for cross-sectional heteroscedasticity and serial correlation, and provides more efficient estimators.

We operationalize Eq. (1) by specifying the equation (Levels Model):

$$\text{MVE}_{it} = \beta_0 + \beta_1 \text{BV}_{it} + \beta_2 \text{NI}_{it} + \beta_3 \text{ORG}_{it} + \beta_4 \text{FCB}_{it} + \beta_5 \text{MAR}_{it} + \beta_6 \text{RRE}_{it} + \beta_7 \text{SGR}_{it} + \beta_8 \text{SGP}_{it} + \beta_9 \text{EV/EBITDA}_{it-1} + \beta_{10} \text{P/B} + \varepsilon_{2,it} \quad (2)$$

4.3. Controlling for accounting method choice

Accounting methods can result in measurement errors in the variables, and the value relevance of accounting variables can, therefore, be affected by competing accounting methods. Oil companies listed on U.S. stock exchanges are allowed to choose between two competing accounting methods for oil and gas exploration and development activities, namely the full-cost and the successful-efforts methods. As Bryant (2003) demonstrates, by recalculating net income and book equity under the alternative method, using the two methods for the same company results in different net income and book equity figures. It is, therefore, imperative to control for accounting-method choice on the value relevance of performance measures in the oil and gas industry. We apply the approach of Quirin et al. (2000) using a dummy variable for accounting method (FC = 1 and SE = 0) and interact this dummy variable with the explanatory variables (levels model controlling for accounting method):

$$\begin{aligned} \text{MVE}_{it} = & \beta_0 + \alpha_0 \text{FC} + \beta_1 \text{BV}_{it} + \alpha_1 \text{BV}_{it} \times \text{FC} + \beta_2 \text{NI}_{it} + \alpha_2 \text{NI}_{it} \times \text{FC} \\ & + \beta_3 \text{OGR}_{it} + \beta_4 \text{FCB}_{it} + \beta_5 \text{MAR}_{it} + \beta_6 \text{RRE}_{it} + \beta_7 \text{SGR}_{it} + \beta_8 \text{SGP}_{it} \\ & + \beta_9 \text{EV/EBITDA}_{it-1} + \beta_{10} \text{P/B}_t + \varepsilon_{3,it} \end{aligned} \quad (3)$$

This approach allows us to examine the value relevance of performance measures after controlling for accounting method.

4.4. Controlling for scale—the returns specification

In the value relevance literature, the levels method dominates over the returns specification. However, in light of the potential negative effects of scale, we also analyze the presence of a structural shift in value relevance using a returns specification. This provides a sensitivity analysis of the price specification (return model):

$$\begin{aligned} \text{ret}_{it} = & \varphi_0 + \varphi_1 \text{NI}_{it} + \varphi_2 \Delta \text{NI}_{it} + \varphi_3 \Delta \text{FDC}_{it} + \varphi_4 \Delta \text{MAR}_{it} + \varphi_5 \Delta \text{RRE}_{it} \\ & + \varphi_6 \Delta \text{SGR}_{it} + \varphi_7 \Delta \text{SGP}_{it} + \varphi_8 \text{EV/EBITDA}_{it-1} + \varphi_9 P/B_t \\ & + \varphi_{10} \Delta \text{OP}_t + \varepsilon_{4it} \end{aligned} \quad (4)$$

We also control for scale and for the chosen accounting method (return model controlling for accounting method):

$$\begin{aligned} \text{ret}_{it} = & \varphi_0 + \varphi_0 \text{FC} + \varphi_1 \text{NI}_{it} + \varphi_1 \text{NI}_{it} \times \text{FC} + \varphi_2 \Delta \text{NI}_{it} + \varphi_2 \Delta \text{NI}_{it} \times \text{FC} \\ & + \varphi_3 \Delta \text{FDC}_{it} + \varphi_4 \Delta \text{MAR}_{it} + \varphi_5 \Delta \text{RRE}_{it} + \varphi_6 \Delta \text{SGR}_{it} + \varphi_7 \Delta \text{SGP}_{it} \\ & + \varphi_8 \text{EV/EBITDA}_{it-1} + \varphi_9 P/B_t + \varphi_{10} \Delta \text{OP}_t + \varepsilon_{5it} \end{aligned} \quad (5)$$

In the following section, we will expand Eqs. (3)–(5) to test for structural breaks in the value relevance of financial statement information.

4.5. The value relevance of accounting information: testing for a structural shift

As the parameters in our model reflect both discount factors and the company's business framework, a radical change in the economic environment may disturb the relationships between market values, accounting figures and other information. The question is whether this will influence the relation between accounting information and valuation. Econometric tests for structural break can be applied to examine whether the valuation process changes at a given point in time. We test for structural breaks using the dummy-variable approach (Gujarati, 1970a,b), which allows us to run a single regression instead of two, which would be the case for a Chow test (Chow, 1960). Gujarati asserts that the dummy variable method is preferable to the Chow test for several reasons. First, running only a single regression can substantially abridge the analyses. Second, the single regression can be used to test a variety of hypotheses. Third, the Chow test does not explicitly indicate which coefficient, intercept, or slope is different. Fourth, pooling increases the degrees of freedom and may improve the relative precision of the estimated parameters. In our case, the third point is of substantial interest, as the upheaval may change some but not all factors. For instance, the relationship between the book value and the share value need not change even if the influence of abnormal income does.

Regression (1): levels model

$$\begin{aligned} \text{MVE}_{it} = & (\beta_0 + \beta_0^*) + (\beta_1 + \beta_1^*) \text{BV}_{it} + (\beta_2 + \beta_2^*) \text{NI}_{it} + (\beta_3 + \beta_3^*) \text{OGR}_{it} \\ & + (\beta_4 + \beta_4^*) \text{FCB}_{it} + (\beta_5 + \beta_5^*) \text{MAR}_{it} + (\beta_6 + \beta_6^*) \text{RRE}_{it} \\ & + (\beta_7 + \beta_7^*) \text{SGR}_{it} + (\beta_8 + \beta_8^*) \text{SGP}_{it} + (\beta_9 + \beta_9^*) \text{EV/EBITDA}_{it-1} \\ & + (\beta_{10} + \beta_{10}^*) P/B_t + \varepsilon_{6it} \end{aligned} \quad (6)$$

where β_j is the set of reference parameters for the full sample period, and $\beta_j^* = \beta_j^* P2$ ($\forall j = 0, \dots, 8$) represent the shift parameters for the upheaval period. We test for a structural break in the model by testing for joint significance of the shift parameters using an *F*-test. If the null hypothesis is rejected, our results provide evidence for a structural break in the econometric modelling of valuation. We also investigate how the valuation process is affected by the individual significance of each of the shift parameters. For instance, a test of the hypothesis $H0: \beta_1^* = \text{zero}$ is a test of whether the book values influence in the valuation process changes.

Regression (2): levels model: controlling for accounting-method choice

$$\begin{aligned} MVE_{it} = & (\beta_0 + \beta_0^*) + (\alpha_0 + \alpha_0^*)FC + (\beta_1 + \beta_1^*)BV_{it} + (\alpha_1 + \alpha_1^*)BV_{it} \times FC \\ & + (\beta_2 + \beta_2^*)NI_{it} + (\alpha_2 + \alpha_2^*)NI_{it} \times FC + (\beta_3 + \beta_3^*)OGR_{it} \\ & + (\beta_4 + \beta_4^*)FCB_{it} + (\beta_5 + \beta_5^*)MAR_{it} + (\beta_6 + \beta_6^*)RRE_{it} \\ & + (\beta_7 + \beta_7^*)SGR_{it} + (\beta_8 + \beta_8^*)SGP_{it} + (\beta_9 + \beta_9^*)EV/EBITDA_{it-1} \\ & + (\beta_{10} + \beta_{10}^*)P/B_t + \varepsilon_{it} \end{aligned} \quad (7)$$

Regression (3): return model: controlling for scale

$$\begin{aligned} ret_{it} = & (\varphi_0 + \varphi_0^*) + (\varphi_1 + \varphi_1^*)NI_{it} + (\varphi_2 + \varphi_2^*)\Delta NI_{it} + (\varphi_3 + \varphi_3^*)\Delta FDC_{it} \\ & + (\varphi_4 + \varphi_4^*)\Delta MAR_{it} + (\varphi_5 + \varphi_5^*)\Delta RRE_{it} + (\varphi_6 + \varphi_6^*)\Delta SGR_{it} \\ & + (\varphi_7 + \varphi_7^*)\Delta SGP_{it} + (\varphi_8 + \varphi_8^*)EV/EBITDA_{it-1} + (\varphi_9 + \varphi_9^*)P/B_t \\ & + (\varphi_{10} + \varphi_{10}^*)\Delta OP_t + \varepsilon_{it} \end{aligned} \quad (8)$$

Regression (4): return model: controlling for scale and accounting-method choice

$$\begin{aligned} ret_{it} = & (\varphi_0 + \varphi_0^*) + (\zeta_0 + \zeta_0^*)FC + (\varphi_1 + \varphi_1^*)NI_{it} + (\zeta_1 + \zeta_1^*)NI_{it} \times FC \\ & + (\varphi_2 + \varphi_2^*)\Delta NI_{it} + (\zeta_2 + \zeta_2^*)\Delta NI_{it} \times FC + (\varphi_3 + \varphi_3^*)\Delta FDC_{it} \\ & + (\varphi_4 + \varphi_4^*)\Delta MAR_{it} + (\varphi_5 + \varphi_5^*)\Delta RRE_{it} + (\varphi_6 + \varphi_6^*)\Delta SGR_{it} \\ & + (\varphi_7 + \varphi_7^*)\Delta SGP_{it} + (\varphi_8 + \varphi_8^*)EV/EBITDA_{it-1} + (\varphi_9 + \varphi_9^*)P/B_t \\ & + (\varphi_{10} + \varphi_{10}^*)\Delta OP_t + \varepsilon_{it} \end{aligned} \quad (9)$$

By estimating the model recursively and changing the potential point for a structural break, one can also test when an eventual structural break took place using the method backward recursive regression (Hendry, 1995). This method requires that one start estimating the equation with a structural break at the latest point possible that gives enough observations to estimate all the parameters using the smallest sample. The regressions are then estimated recursively with the shifting point moving forward until the sample at the other end of the data set becomes too small to estimate all the parameters. Since we have a panel with a sufficiently large cross section, we can estimate all parameters without any problems in a single cross section, and we can therefore test for a structural break between all periods. If the test for a structural break is statistically significant at more than one point, one chooses the point with the largest test statistic as the point of the break.

4.6. *Accruals vs cash flows*

In order to examine the difference between cash flows and accruals, all regressions are re-estimated using cash flow as the profit measure instead of net income. Since $NI = CFO + \text{Accruals}$, we would have liked to model both cash flow and accruals in the same model. Unfortunately, due to high correlation (>0.85) between the three variables—net income, cash flow and accruals—we are not able to model cash flow and accrual together, or cash flow and net income in the same econometric model. Separate regressions are necessary in order to avoid the potential negative effects of multicollinearity.

4.7. *Research hypotheses*

The two questions that the research aims to ask can be formulated as two hypotheses, in alternative form:

H₁. A structural shift in the value relevance of ten performance measures has collectively occurred during 1992–2005

H₂. A structural shift in the value relevance of ten individual performance measures has occurred during 1992–2005

H₁ is tested using the dummy-variable method, while significant interaction coefficients between a performance measure and P2 tests H₂. We also examine the robustness of Eq. (6) by controlling for accounting method and scale (using the returns specification).

5. *Sample data*

We test the research hypotheses by estimating regression models for a sample of E&P and integrated international oil and gas companies. Accounting data were collected from the John S. Herold database. The J.S. Herold database consists of financial and operating data from annual financial statements of more than 500 publicly traded energy companies worldwide. We require the firms in the data base to meet certain screening criteria in order to be included in our sample. First, we only include firms with at least five years of consecutive annual observations. Second, only oil companies with positive book-value-of-equity are included. This screening procedure resulted in 114 firms, with potentially 1482 firm-year observations (13 years \times 114 firms). Descriptive statistics for the variables in our sample are reported in Table 1, for two separate periods 1992–1999 and 2000–2005, and for the entire 14 year period.

The mean and the 25th and 75th percentiles are indicative of a sample with a large size variation. Ratios, such as MAR, show lower variation than for instance NI and BV. Out of 934 observations, only 253 are from the period 1992–1997. Hence, the panel is unbalanced. It is also important to point out that the oil industry has witnessed several mergers during 1992–2005. This means that firms may have entered the sample when companies in the sample has merged or acquired other companies. This may raise some concerns that the sample is not comparable over time. And, because of the size of the sample, 114 companies, and frequent M&A activity in this industry, may affect a significant portion of the sample.

Table 1
Descriptive statistics of sample data

Variable		No. obs.	Mean	Standard deviation	25%	Median	75%
MVE	1992–1999	340	13,349.2	39,494.4	169.6	1447.7	5102.5
	2000–2005	594	16,342.3	45,190.7	356.1	1564.7	9163.7
	1992–2005	934	13,151.6	43,206.6	287.2	1530.1	7301.3
BV	1992–1999	340	4985.3	12,705.7	75.4	568.0	2695.6
	2000–2005	594	6408.7	15,598.6	171.5	698.1	4270.9
	1992–2005	934	5890.5	14,621.0	124.8	687.5	3338.6
NI	1992–1999	340	595.9	1675.2	5.4	39.8	282.9
	2000–2005	594	1314.6	3551.8	20.0	103.2	798.7
	1992–2005	934	1053.0	3026.2	12.7	82.7	526.8
CFO	1992–1999	340	1396.2	3499.2	19.9	182.0	682.9
	2000–2005	594	2224.0	5216.8	56.3	277.6	1596.3
	1992–2005	934	1922.7	4680.3	37.4	243.5	1249.8
OGR	1992–1999	340	1795.8	4316.3	29.3	283.3	953.9
	2000–2005	594	1846.7	4261.8	35.4	173.2	1102.8
	1992–2005	934	1828.2	4279.5	33.5	193.8	1045.4
FCB	1992–1999	340	8.6	6.2	5.1	7.1	9.8
	2000–2005	594	14.8	11.1	7.4	12.1	18.5
	1992–2005	934	12.5	10.1	6.2	9.6	15.4
MAR	1992–1999	340	9.6	3.3	7.7	9.3	11.2
	2000–2005	594	20.1	7.7	14.5	18.5	24.4
	1992–2005	934	16.3	8.2	9.9	14.4	20.8
RRE	1992–1999	340	1.5	1.0	0.8	1.2	1.8
	2000–2005	594	1.8	1.7	0.9	1.3	2.1
	1992–2005	934	1.6	1.5	0.9	1.3	1.9
SGR	1992–1999	340	67.6	475.8	0.0	7.3	63.5
	2000–2005	594	65.2	317.7	−0.8	5.3	43.2
	1992–2005	934	66.1	382.6	−0.4	5.6	46.8
SGP	1992–1999	340	5.4	28.0	0.0	1.1	4.9
	2000–2005	594	5.7	19.7	0.0	0.7	4.7
	1992–2005	934	5.6	23.0	0.0	0.8	4.8
EV/EBITDA _{t-1}	1992–1999	340	8.4	5.5	5.9	7.2	9.5
	2000–2005	594	7.0	3.9	4.8	6.1	8.1
	1992–2005	934	7.5	4.6	5.1	6.7	8.6
P/B	1992–1999	8	3.5	1.2	2.6	3.1	4.2
	2000–2005	6	3.2	0.6	2.9	3.1	3.3
	1992–2005	14	3.4	0.9	2.7	3.1	3.8
OP	1992–1999	8	17.2	2.5	16.4	17.0	18.5
	2000–2005	6	34.8	11.8	28.5	28.8	38.3
	1992–2005	14	24.5	11.7	17.0	19.9	28.6

Notes: The following variables are measured in U.S. millions at year-end: MVE is market value of equity; BV is the book value of equity; NI is net income; CFO is cash flow from operations; and OGR is the amount of oil and gas reserves (in BOE). The following variables are measured as U.S. dollars per barrel of oil equivalent: FCB is finding and development cost per barrel of oil equivalent (BOF); MAR is margin per BOE; RRE is reserve replacement efficiency; SGR is change in oil and gas reserves (in BOE) per year; SGP is change in production (in BOE) of oil and gas per year. The following variables are ratios of market values to accounting numbers: EV/EBITDA is the price-to-earnings ratio; EV/EBITDA_{t-1} is the price-to-earnings ratio for the previous year; OP is the operating profit to earnings before interest, taxes and depreciation and amortization ratio; P/B is the price-to-book ratio for the S&P500 index.

Table 2a

Pearson correlation coefficients for key variables: Levels models

	NI	CFO	OGR	FCB	MAR	RRE	SGR	SGP	EV/EBITDA	S&P 500 <i>P/B</i>
BV	0.47	0.53	0.50	0.56	0.01	0.08	0.40	0.29	−0.25	0.03
NI		0.62	0.47	0.46	0.14	0.14	−0.03	0.06	−0.18	0.07
CFO			0.44	0.68	0.11	0.004	0.11	0.003	−0.21	0.01
OGR				0.48	−0.25	−0.04	0.41	0.20	−0.12	0.13
FCB					0.05	−0.23	0.34	0.39	−0.11	0.04
MAR						0.06	−0.09	−0.10	−0.10	−0.25
RRE							−0.07	−0.04	−0.07	−0.01
SGR								0.22	−0.01	0.05
SGP									0.03	0.01
EV/EBITDA										0.12

Notes: Variable definitions are as follows. BV is the book value of equity, NI is net income, CFO is cash flow from operations, OGR is amount of oil and gas reserves (in BOE), FCB is finding and development cost per barrel of oil equivalent (BOE), MAR is margin per BOE, RRE is reserve replacement efficiency, SGR is change in oil and gas reserves (in BOE) per year, SGP is change in production (in BOE) of oil and gas per year, EV/EBITDA is the previous year's enterprise-to-earnings before interest, taxes and depreciation and amortization ratio, *P/B* is the price-to-book ratio for the S&P500 index.

Table 2a (levels models) and Table 2b (return models) report Pearson correlation coefficients among the explanatory variables of our model.

The largest correlation exists between BV and NI (0.55) and BV and SGR (0.55). These correlations are lower than the 0.6 “rule of thumb” frequently used in econometrics. The other correlations are fairly low.

Table 2b

Pearson correlation coefficients for key variables: Return models

	Δ NI	CFO	Δ CFO	Δ FCB	Δ MAR	Δ RRE	Δ SGR	Δ SGP	EV/ EBITDA	S&P500 <i>P/B</i>	Δ OP
NI	0.23	0.62	0.14	0.08	0.02	0.33	0.03	−0.01	−0.19	0.07	0.22
Δ NI		0.17	0.21	0.10	0.02	0.44	0.00	−0.03	0.10	0.04	0.18
CFO			0.24	0.10	0.03	0.17	0.02	0.01	−0.21	0.01	0.17
Δ CFO				0.22	0.04	0.34	0.004	0.05	0.12	0.07	0.23
Δ FCB					0.01	−0.12	0.05	0.07	0.15	−0.11	0.03
Δ MAR						0.04	−0.0004	−0.0021	0.02	−0.003	0.09
Δ RRE							0.001	−0.04	0.22	0.18	0.37
Δ SGR								−0.12	−0.01	0.02	0.03
Δ SGP									0.05	0.004	0.0007
EV/EBITDA										0.12	0.01
S&P500 <i>P/B</i>											0.11

Notes: Variable definitions are as follows. NI is net income, CFO is cash flow from operations, Δ NI is change in net income per year, Δ CFO is the change in cash flow from operations per year, Δ FCB is the change in finding and development cost per barrel of oil equivalent (BOE), Δ MAR is the change in margin per BOE, Δ RRE is reserve replacement efficiency, Δ SGR is the rate of change in oil and gas reserves (in BOE) per year, Δ SGP is rate of change in production (in BOE) of oil and gas per year, EV/EBITDA is the previous year's enterprise-to-earnings before interest, taxes and depreciation and amortization ratio, *P/B* is the price-to-book ratio for the S&P500 index.

6. Results and discussion

6.1. The timing of the structural break in valuation

Although circumstantial evidence would suggest that a structural break took place in 1998–2002 (i.e., fall in oil price combined with the onset of a series of mega-mergers), we apply backward recursive regressions to find the actual start year for the transition period. We do this by changing the P2 variable in Eqs. (6)–(9). First, we set P2=2005 and then we test for a structural break using the dummy-variable-approach test. This is done for all the years P2=1993,..., 2005. The test statistics are shown in Fig. 2 for the model in Eq. (6), and as one can see the structural break took place in 2000. Also, for the other models, the test statistic indicates that the structural break took place in 2000, and as discussed below, the test statistic was significant in all models. That the structural break took place in 2000 also corresponds with other developments in the oil industry, as this was the year of the first merger announcement. Consequently, we analyze the value relevance of accounting and operational information pre and post by dividing our data set into two sub-samples, one for the years 1992–1999 and one for the years 2000–2005.

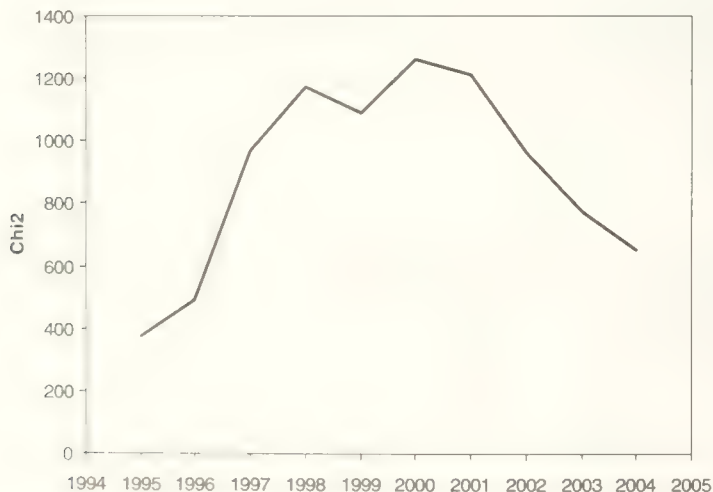


Fig. 2. Testing for the timing of the structural shift (price regression). Notes: The model used is the price regression in Eq. (6).

$$\begin{aligned} \text{MVE}_{it} = & \beta_0 + \beta_1 P_{it} + \beta_2 \text{BV}_{it} + (\beta_3 + \beta_3^*) \text{NI}_{it} + (\beta_4 + \beta_4^*) \text{ORG}_{it} + (\beta_5 + \beta_5^*) \text{FCB}_{it} \\ & + (\beta_6 + \beta_6^*) \text{MAR}_{it} + (\beta_7 + \beta_7^*) \text{RRE}_{it} + (\beta_8 + \beta_8^*) \text{SGR}_{it} + (\beta_9 + \beta_9^*) \text{SGP}_{it} \\ & + (\beta_{10} + \beta_{10}^*) \text{TV} / \text{EBITDA}_{it} + (\beta_{11} + \beta_{11}^*) P/B_{it} + \varepsilon_{it} \end{aligned}$$

The critical value $\chi^2_{1-\alpha}$ for P2. The regression is iteratively estimated using P2 = 1995, ..., 2004. For each P2, a χ^2 is calculated using the dummy variable technique (Gujarati, 1970a,b). According to (Hendry, 1995), the year in which the maximum χ^2 value can be observed can be regarded as the year of the onset of the structural break.

6.2 Tests for structural breaks

6.2.1. The levels model

The results from the levels models are shown in Table 3. Using the dummy-variable test, we find evidence for a structural break in the value-relevance of accounting information

Table 3
Levels model

Variables	A: Net income		B: Cash flow	
	Coefficient	t-value	Coefficient	t-value
Intercept	0.661	***	0.551	***
P2	−0.265	*	0.589	***
BV	0.349	***	0.308	***
BV × P2	0.323	***	0.533	***
NI	1.547	**		
NI × P2	0.332	0.615		
CFO				***
CFO × P2			0.701	***
R	0.189	*	0.122	
R × P2	−0.356	***	−0.089	0.084
FCB	0.769	***	0.615	**
FCB × P2	0.153		0.486	*
MAR	0.015	**	0.020	***
MAR × P2	−0.006		−0.004	0.056
RRE	0.003		0.015	0.77
RRE × P2	−0.006	−0.27	0.006	0.28
SGR	1.669	***	1.761	***
SGR × P2	−0.187	−0.42	−0.969	***
SGP	−0.781	−0.29	−2.467	−0.81
SGP × P2	1.676	0.31	5.989	1.09
EV/EBITDA	0.012	**	0.012	**
EV/EBITDA × P2	0.022	***	0.026	***
S&P500 <i>P/B</i>	−0.020	−1.31	−0.017	−1.08
S&P500 <i>P/B</i> × P2	−0.027	0.85	0.030	0.03
N		935		935
Wald χ^2		1227.2		1326.6
Log likelihood		432.8		−441.7
χ^2		1262.1		1244.8
P		<0.001		<0.001

$$\begin{aligned} \text{MVE} = & (\beta_0 + \beta'_0) + (\beta_1 + \beta'_1)BV_{i,t} + (\beta_2 + \beta'_2)NI_{i,t} + (\beta_3 + \beta'_3)CFO_{i,t} + (\beta_4 + \beta'_4)FCB_{i,t} \\ & + (\beta_5 + \beta'_5)MAR_{i,t} + (\beta_6 + \beta'_6)RRE_{i,t} + (\beta_7 + \beta'_7)SGR_{i,t} + (\beta_8 + \beta'_8)SGP_{i,t} \\ & + (\beta_9 + \beta'_9)EV/EBITDA_{i,t} + (\beta_{10} + \beta'_{10})P/B_{i,t} \end{aligned}$$

Notes: *** significant at the 10% significance level, ** significant at the 5% significance level, * significant at the 1% significance level. Variable definitions are as follows: P2 is a dummy for the years 1998–2005. BV is the book value of equity, NI is net income, CFO is cash flow from operations, FCB is finding and development cost per barrel of oil equivalent (BOE), MAR is margin per BOE, RRE is reserve replacement efficiency, SGR is change in oil and gas reserves (in BOE) per year, SGP is the change in production (in BOE) of oil and gas per year, EV/EBITDA is the previous year's enterprise-to-earnings before interest, taxes and depreciation and amortization ratio, *P/B* is the price-to-book ratio for the S&P500 index.

Table 4
Levels model, controlling for accounting-method choice

Variables	A: Net income		B: Cash flow	
	Coefficient	z-value	Coefficient	z-value
Intercept	0.706	***	0.506	***
P2	−0.256	*	−0.433	***
FC	−0.140	*	−0.035	
FC × P2	0.039		−0.084	
BV	0.318	***	0.160	*
BV × P2	0.194	*	0.493	***
BV × FC	0.113		0.335	***
BV × FC × P2	0.182		−0.027	
NI	1.259	*		
NI × P2	1.291			
NI × FC	0.694			
NI × FC × P2	−1.751			
CFO			1.746	***
CFO × P2			−1.337	***
CFO × FC			−1.130	
CFO × FC × P2			0.654	
R	−0.144		0.117	
R × P2	−0.382	**	−0.067	
FCB	0.680	***	0.405	
FCB × P2	0.274		0.731	**
MAR	0.017	**	0.020	
MAR × P2	−0.009		−0.004	
RRE	0.0004		0.011	
RRE × P2	−0.003		0.013	
SGR	1.557	***	1.578	***
SGR × P2	−0.137		−0.749	*
SGP	0.192		−1.397	
SGP × P2	−1.148		3.734	
EV/EBITDA	0.010	**	0.012	**
EV/EBITDA × P2	0.023	***	0.023	***
S&P500 PB	−0.022		−0.010	
S&P500 PB × P2	−0.028		0.015	
N		935		933
Wald χ^2		1227.7		1244.7
Log likelihood		−428.3		−437.0
χ^2		1230.6		1165.9
P		<0.001		<0.001

$$MTE = (\beta_0 + \beta_1^*P2 + \beta_2^*FC + \beta_3^*FC \times P2 + \beta_4^*BV + \beta_5^*BV \times P2 + \beta_6^*BV \times FC + \beta_7^*BV \times FC \times P2 + \beta_8^*NI + \beta_9^*NI \times P2 + \beta_{10}^*NI \times FC + \beta_{11}^*NI \times FC \times P2 + \beta_{12}^*CFO + \beta_{13}^*CFO \times P2 + \beta_{14}^*CFO \times FC + \beta_{15}^*CFO \times FC \times P2 + \beta_{16}^*R + \beta_{17}^*R \times P2 + \beta_{18}^*FCB + \beta_{19}^*FCB \times P2 + \beta_{20}^*MAR + \beta_{21}^*MAR \times P2 + \beta_{22}^*RRE + \beta_{23}^*RRE \times P2 + \beta_{24}^*SGR + \beta_{25}^*SGR \times P2 + \beta_{26}^*SGP + \beta_{27}^*SGP \times P2 + \beta_{28}^*EV/EBITDA + \beta_{29}^*EV/EBITDA \times P2 + \beta_{30}^*S\&P500\ PB + \beta_{31}^*S\&P500\ PB \times P2 + \beta_{32}^*N) + \epsilon_{it}$$

Notes: *** – significant at the 10% significance level, ** – significant at the 5% significance level, * – significant at the 1% significance level. Variable definitions are as follows: P2 is a dummy for the years 1998–2005. FC is a dummy variable for companies that use the full cost accounting method. BV is the book value of equity. NI is net income, CFO is cash flow from operations. FCB is finding and development cost per barrel of oil equivalent (BOE). MAR is margin per BOE. RRE is reserve replacement efficiency, SGR is change in oil and gas reserves (in BOE) per year. SGP is the change in production (in BOE) of oil and gas per year. EV/EBITDA is the previous year's enterprise-to-earnings before interest, taxes, and depreciation and amortization ratio. P/B is the price-to-book ratio for the S&P500 index.

Table 5
Return model

Variables	A: Net income			B: Cash flow		
	Coefficient		z-value	Coefficient		z-value
Intercept	−0.249	*	−2.20	−0.252	***	−1.58
P2	0.999	***	5.82	0.964	***	4.64
NI	5.349	***	10.68			
NI × P2	−3.140	***	−5.71			
ΔNI	0.020	**	2.14			
ΔNI × P2	−0.010		−0.81			
CFO				2.313	***	5.65
CFO × P2				−1.198	***	−2.78
ΔCFO				0.014		0.47
ΔCFO × P2				0.030		0.76
ΔFCB	0.268	***	5.80	0.163	***	3.13
ΔFCB × P2	−0.149	***	2.78	−0.021		−0.36
ΔMAR	0.008	***	3.73	0.003		0.98
ΔMAR × P2	0.314	***	3.62	0.242	***	2.69
ΔRRE	0.004		0.04	0.115		1.53
ΔRRE × P2	−0.058		−0.59	−0.037		−0.43
ΔSGR	0.009	**	2.01	0.006		1.39
ΔSGR × P2	−0.008	*	−1.73	−0.005		−1.18
ΔSGP	0.001		0.33	−0.001		−0.03
ΔSGP × P2	0.001		0.23	0.001		0.28
EV/EBITDA	−0.003		0.31	−0.001		−0.02
EV/EBITDA × P2	0.007		0.54	0.002		0.18
S&P500 PB	0.022		0.93	0.006		0.24
S&P500 PB × P2	−0.282	***	−6.13	−0.270	***	−5.79
ΔOP	0.459	***	3.78	0.463	***	3.84
ΔOP × P2	−0.138		−0.88	−0.063		−0.40
N			733			732
Wald χ^2			741.8			474.6
Log likelihood			−362.9			−358.6
χ^2			422.7			131.0
p			<0.001			<0.001

$$r_{ctrl} = (\varphi_0 + \varphi_0^*) + (\varphi_1 + \varphi_1^*)NI_{it} + (\varphi_2 + \varphi_2^*)\Delta NI_{it} + (\varphi_3 + \varphi_3^*)\Delta CFO_{it} + (\varphi_4 + \varphi_4^*)\Delta MAR_{it} \\ + (\varphi_5 + \varphi_5^*)\Delta RRE_{it} + (\varphi_6 + \varphi_6^*)\Delta SGR_{it} + (\varphi_7 + \varphi_7^*)\Delta SGP_{it} + (\varphi_8 + \varphi_8^*)EV/EBITDA_{it-1} \\ + (\varphi_9 + \varphi_9^*)P_{it} + (\varphi_{10} + \varphi_{10}^*)\Delta OP_{it} + \varepsilon_{N, it}$$

Notes: ***=significant at the 10% significance level, **=significant at the 5% significance level, * = significant at the 1% significance level. Variable definitions are as follows: P2 is a dummy for the years 1998–2005. NI is net income, CFO is cash flow from operations, ΔNI is change in net income per year, ΔCFO is the change in cash flow from operations per year, ΔFCB is the change in finding and development cost per barrel of oil equivalent (BOE), ΔMAR is the change in margin per BOE, ΔRRE is reserve replacement efficiency, ΔSGR is the rate of change in oil and gas reserves (in BOE) per year, ΔSGP is rate of change in production (in BOE) of oil and gas per year, EV/EBITDA is the previous year's enterprise-to-earnings before interest, taxes and depreciation and amortization ratio, P/B is the price-to-book ratio for the S&P500 index, ΔOP is the annual change in oil price.

With χ^2 test statistics of 1262.1 (levels model: net income) and 1244.8 (levels model: cash flow), the nulls are all rejected ($p < 0.001$). These results indicate that the relationship between accounting information and valuation for oil companies have changed from pre-

Table 6
Return model, controlling for accounting-method choice

Variables	A: Net income			B: Cash flow		
	Coefficient		z-value	Coefficient		z-value
Intercept	0.034		0.24	−0.089		−0.54
FC	−0.291	***	−2.86	−0.308	**	−2.32
FC × P2	0.525	***	4.47	0.517	***	3.48
P2	0.516	**	2.59	0.618	***	2.90
NI	2.663	***	2.71			
NI × P2	0.158		0.15			
NI × FC	5.163	***	2.96			
NI × FC × P2	−6.114		−3.38			
ΔNI	0.012		1.22			
ΔNI × P2	−0.013		−1.07			
ΔNI × FC	0.008		0.25			
ΔNI × FC × P2	0.057		1.50			
CFO				1.626	***	3.35
CFO × P2				−0.037		−0.07
CFO × FC				1.445	*	1.95
CFO × FC × P2				−2.154	***	−2.74
ΔCFO				0.016		0.51
ΔCFO × P2				−0.188	***	−3.10
ΔCFO × FC				0.029		0.39
ΔCFO × FC × P2				0.228	**	2.46
ΔFCB	0.212	***	4.18	0.157	***	3.02
ΔFCB × P2	−0.128	**	−2.23	0.005		0.08
ΔMAR	0.006	***	2.97	0.004		1.22
ΔMAR × P2	0.236	***	2.68	0.244	***	2.81
ΔRRE	0.063		0.68	0.119		1.64
ΔRRE × P2	−0.157		−1.52	−0.055		−0.07
ΔSGR	0.009	*	1.90	0.005		1.15
ΔSGR × P2	−0.007		−1.46	−0.003		−0.72
ΔSGP	0.003		0.64	−0.001		−0.16
ΔSGP × P2	−0.002		0.34	0.003		0.69
EV/EBITDA	−0.006		−0.54	−0.003		−0.30
EV/EBITDA × P2	0.017		1.31	0.015		1.21
S&P500 PB	−0.004		−0.16	−0.003		−0.03
S&P500 PB × P2	−0.237	***	−5.39	−0.254	***	−5.75
ΔOP	0.485	***	4.25	0.452	***	3.97
ΔOP × P2	−0.152		−1.00	−0.065		−0.43
N			733			732
Wald χ^2			649.3			558.2
Log likelihood			−339.8			−337.8
χ^2			159.2			138.4
\hat{p}			<0.001			<0.001

upheaval to the upheaval period. Testing for the joint value relevance is important since this implicitly tests the value relevance of the markets' valuation of accounting information. By testing for structural breaks in Eqs. (6)–(9), we simultaneously investigate whether the industry restructuring resulted in a structural shift in the financial markets' valuation models.

6.2.2. The Return Model

We also find evidence of a structural shift using the return specification and the results are shown in Tables 5 and 6. The χ^2 test statistics are 422.7 (return model: net income) and 131.0 (return model: cash flow), the nulls are all rejected ($p < 0.001$). These results indicate that the evidence of a structural shift derived using the price specification is robust.

6.2.3. Controlling for accounting method

Tables 4 and 6 present the results from the models where we have included dummies for accounting-method choice. The χ^2 test statistics are 1230.6 (levels model: accounting method/net income) and 1165.9 (Levels Model: accounting method/cash flow), 159.2 (Return Model: accounting method/net income) and 138.4 (return model: accounting method/cash flow), the nulls are all rejected ($p < 0.001$). These results indicate that the evidence of a structural shift is robust when controlling for accounting method.

6.3. Discussion of the structural break in valuation

6.3.1. The Levels Model

While the results in the previous section indicate that the industry restructuring has instigated a change in valuation models, it is important to examine which value drivers have been instrumental in this shift. An examination of the coefficients on the interactions between individual performance measures and the P2 dummy will indicate which figures have been instrumental in the structural shift. Table 3 indicates a structural shift in the coefficients on BV, CFO, growth in oil and gas reserves (CFO model), oil and gas reserves (NI model), FCB (CFO model), and the EV/EBITDA ratio. The coefficient on book value of equity has approximately doubled from 0.349 for 1992–1999 to 0.672 (0.349+0.323) for 2000–2005 (in the NI model). The increase in value relevance of book equity is in line with the hypothesis that deterioration in financial health reduces the value relevance of accruals and increases that of book equity, as discussed by Barth et al. (1998) and Davis-Friday et al. (2006). The decrease in the value relevance of cash flows, however, is not in line with the hypothesis. The coefficient on cash flow decreases from 0.830 to 0.129 (0.830–0.701). The results indicate that book value has become more important since 1999,

Notes to Table 6

$$r_{it} = (\varphi_{0i} + \varphi_{0i}^*) + (\varphi_{1i} + \varphi_{1i}^*)FC + (\varphi_2 + \varphi_{2i}^*)NI_{it} + (\varphi_{3i} + \varphi_{3i}^*)NI_{it} \cdot FC + (\varphi_{4i} + \varphi_{4i}^*)\Delta NI_{it} \\ + (\varphi_{5i} + \varphi_{5i}^*)\Delta NI_{it} \cdot FC + (\varphi_{6i} + \varphi_{6i}^*)IF_{FC, it} + (\varphi_{7i} + \varphi_{7i}^*)IM_{AR, it} + (\varphi_{8i} + \varphi_{8i}^*)\Delta RRE_{it} \\ + (\varphi_{9i} + \varphi_{9i}^*)\Delta SGR_{it} + (\varphi_{10i} + \varphi_{10i}^*)\Delta SGR_{it} + (\varphi_{11i} + \varphi_{11i}^*)EV/EBITDA_{it} + (\varphi_{12i} + \varphi_{12i}^*)P/B \\ + (\varphi_{13i} + \varphi_{13i}^*)\Delta OP_{it} + \varepsilon_{it}$$

Notes: *** significant at the 10% significance level, ** = significant at the 5% significance level, * significant at the 1% significance level. Variable definitions are as follows: P2 is a dummy for the years 1998–2005. FC is a dummy variable for companies that use the full cost accounting method. NI is net income, CFO is cash flow from operations, ΔNI is change in net income per year, ΔCFO is the change in cash flow from operations per year, ΔFCB is the change in finding and development cost per barrel of oil equivalent (BOE), ΔMAR is the change in margin per BOE, ΔRRE is reserve replacement efficiency, ΔSGR is the rate of change in oil and gas reserves (in BOE) per year, ΔSGP is rate of change in production (in BOE) of oil and gas per year, EV/EBITDA is the previous year's enterprise-to-earnings before interest, taxes and depreciation and amortization ratio, P/B is the price-to-book ratio for the S&P500 index. ΔOP is the annual change in oil price

while other fundamentals such as cash flow have decreased. Apparently, the information quality of contemporaneous cash flow post 1999 has worsened.

The value relevance of total oil and gas reserves and that of changes in oil and gas reserves has decreased from pre-2000 to post-1999. Our findings indicate that reserve replacement became less important for investors during this upheaval period. In fact, during the upheaval period, the largest oil and gas companies focused their attention on capital discipline and cost cutting (Anttil and Arnett, 2002), which is not compatible with the need to invest substantial amounts of capital in order to develop and produce new oil and gas reserves.

The results also show that the previous year's EV/EBITDA ratio became more value relevant in the latter period of our study. A high EV/EBITDA ratio results in a higher valuation for the average oil company, indicating that the trend in valuation year-to-year became more important during the upheaval period.

In total, the results seem to indicate that accounting figures are less value relevant during the upheaval period than during the pre-upheaval period. The exception is the valuation multiple EV/EBITDA and book equity.

Similar results are obtained when controlling for accounting method (Table 4).

6.3.2. The Return Model

An examination of the coefficients on the interactions between changes in individual performance measures and the P2 dummy will indicate which figures have been instrumental in the structural shift. Table 5 indicates a structural shift in the coefficients on NI, change in growth in reserves, and that changes in both margin per BOE and finding costs per BOE have occurred (in the NI model). The coefficient on net income has decreased from 5.349 during 1992–1999 to 2.209 (5.349–3.140) during 2000–2005. A similar decrease is seen for cash flow. This decrease in value relevance was also evident from the levels models. During the upheaval period, book values have become more important for explaining future cash flows than current accounting figures such as net income and cash flow. This finding also extends to several of the performance ratios such as rates of changes in finding costs, reserve replacement efficiency, and growth in reserves.

Table 6 presents the results from the return model controlling for accounting method. The results indicate that the accounting method does affect the value relevance of accounting profit. Coefficients on the interaction variables NI·FC and CFO·FC are significant. Furthermore, the structural shift (reduction) in the value relevance of CFO observed in the price regression (Table 3) seems to be related to FC companies. The results also indicate a structural break in the changes in cash flow.

7. Conclusion

Financial statement information, such as earnings, is an important source of information for financial analysts and investors as they try to forecast future cash flows. However, changing economic conditions and industry restructuring may change the quality of accounting information and its value relevance, affecting its usefulness for practitioners. To investigate this potential in industry upheaval in the valuation process, we test for structural breaks in the valuation model.

We provide an empirical analysis for the international oil industry. This is an industry that experienced a wave of mergers and changing economic conditions during the previous decade.

Our results indicate that the upheaval that the international oil industry witnessed during 1998–2002 has lead to a change in the relative value relevance of accounting information. The value relevance of accounting variables such as book-value-of-equity has increased, while that of net income has decreased. Moreover, the value relevance of cash flows has increased. We find evidence to support our hypothesis of a structural break in the relation between valuation and financial-statement information in the oil industry.

It is likely that energy growth rates in China and India have been instrumental in the oil-price hike in recent years. If the energy growth rates in these two countries continue as expected, in the future, they are likely to impact the price of oil and the valuation of international oil companies. Especially since 2003 the oil price increase has been attributed to increased energy demand from these two countries. How demand-side effects (e.g., from India and China) and supply-side effects (investments) affect the oil price and the valuation of oil companies would be an interesting topic for future research.

Another topic for future research is to analyze how the development in both the actual inventory of oil and the booked oil reserves in the possession of the oil companies have driven up the book value and share prices of oil and gas companies during the last years.

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ELSEVIER

An investigation of compliance with international accounting standards by listed companies in the Gulf Co-Operation Council member states

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Abstract

This study investigates the extent of compliance with international accounting standards (IASs) by companies in the Gulf Co-Operation Council (GCC) member states (Bahrain, Oman, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates). Based on a sample of 137 companies (436 company-years) we find that compliance increased over time, from 68% in 1996 to 82% in 2002. Despite strong economic and cultural ties between the GCC states, there was significant between-country variation in compliance and among companies based on size, leverage, internationality, and industry. The study provides evidence of de jure but not de facto harmonization in the region. Noncompliance reflected some ineffectiveness in the functions of external auditors and enforcement bodies, which may be of interest to countries that have adopted IASs recently.

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Keywords: Adoption of International Accounting Standards (IAS); Financial-reporting compliance; Audit function; Enforcement of accounting standards; Gulf Co-Operation Council (GCC) member states

1. Introduction

Rapid globalization of financial markets has given rise to demands for more internationally comparable financial reporting. Harmonization of accounting is one way

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to promote more transparent and consistent reporting and to that end the International Accounting Standards Board (IASB) produces international accounting standards for use by private sector entities throughout the world. Since 2005 there has been widespread adoption of IASB standards on a mandatory basis. Consequently, there is increased interest in the comparability of reporting being achieved as well as the role of auditors and enforcement bodies in promoting compliance (SEC, 2000; CESR, 2003; Schipper, 2005).

The aim of this paper is to investigate the level of compliance over time with international accounting standards (IASs) in the six Gulf Cooperation Council (GCC) states, namely Bahrain, Oman, Kuwait, Saudi Arabia, Qatar, and the United Arab Emirates (UAE) and the factors associated with compliance. The GCC countries made IAS mandatory progressively since 1986 for some or all listed companies. This setting allows us to explore the use of IASs in a number of economically important developing countries, which were early adopters of IASs. Mandatory use in the GCC countries provides an opportunity to examine the role of external auditors and enforcement bodies in promoting compliance with IASs.

Using a self-constructed compliance checklist, we measure the extent of 137 listed companies' compliance with 14 relevant IASs over the period 1996–2002 (436 company-years).¹ For the GCC as a whole, the average level of compliance for all years was 0.75; for disclosure it was 0.69 and for measurement 0.81. The level of compliance increased over time in each state, with overall measures increasing from 0.68 in 1996 to 0.82 in 2002, indicating that compliance has been improving in the region.

Despite strong links between member states, compliance varies among them. Since diversity could reflect differences in each country's regulatory framework, we provide a self-constructed enforcement score (encompassing legal requirements, quality of the audit function, and activities of enforcement bodies) for each country. The highest average compliance level for all years is in the UAE (0.80), followed by Saudi Arabia (0.78), Kuwait (0.75), Oman (0.74), Bahrain (0.73) and Qatar (0.70). Differences in compliance levels are generally consistent with national enforcement scores. Compliance also varies by industry, being lower among financial-sector firms. It is higher for larger companies and those with higher leverage and a greater international presence.

Compliance with IASs has been measured in several settings in prior research. For example, disclosure compliance is reported in Australia (0.94; Tower, Hancock, & Taplan, 1999), Germany (0.81; Glaum & Street, 2003) and Switzerland (0.74; Street & Gray, 2001). Measurement compliance is reported for Germany (0.86) and Switzerland (0.92; Street & Gray, 2001). Our study adds to this literature in two significant ways. First, it considers countries from a developing region which has considerable economic and political importance but has been the subject of relatively little research. Prior studies, such as Abdelrahim, Hewaidy, and Mostafa (1997), Abdelrahim and Mostafa (2000) and Joshi and Al-Mudhahki (2001), have not examined compliance in depth, across countries and over time. Our study achieves this and provides empirical evidence about the progress of harmonization in the region. The results are, therefore, of interest to academics and practitioners following the development of more comparable financial reporting on a global scale.

Second, the GCC setting has several features which are useful in a study of compliance. Some countries in the region have been early mandatory adopters of IASs, which means their companies have considerable experience with use of IASs in a mandatory rather than voluntary environment. In the GCC setting we can investigate the relationship of national regulatory frameworks and mandatory compliance over time. In other countries companies have adopted IASs more recently (for example, in the European Union) or their use has been voluntary (as in Switzerland and Germany in the early 1990s). Most previous IAS-compliance studies have been in settings where use of IASs is voluntary or not subject to national enforcement (Nobes, 1990; Street, Gray, & Bryant, 1999; Tower et al., 1999; Street & Bryant, 2000; Street & Gray, 2001; Glaum & Street, 2003). Our study adds to the literature by considering compliance in a mandatory setting. Further, it provides useful insights about the relationship of IASs adoption, compliance levels, and the effectiveness of independent auditors and enforcement bodies. Following widespread adoption of IASs, attention has now focused on the extent to which companies comply with IASs in a mandatory setting (Schipper, 2005; Brown & Tarca, 2005). Our study is one of the first to provide empirical evidence about this issue. Although we consider only one region and six countries, our results highlight issues which may be equally relevant in other countries where IASs have been adopted more recently.

The remainder of the paper is organized as follows. The next section presents the institutional framework for financial reporting in the GCC member states, reviews relevant literature and outlines the research question. The third section describes sample selection, data collection and statistical method. Results, robustness checks, and limitations are reported in the fourth section. The final section concludes the study.

2. Background and research question

The six countries included in this study are members of the GCC, formed in 1981 to promote economic cooperation and development in the region. They have strong religious and economic ties, a shared Muslim culture and together hold 45% of the world's oil reserves. The countries have experienced strong economic growth in recent years with combined gross domestic product (GDP) per capita increasing from US\$11,000 in 2002 to US\$14,208 in 2006. The stock exchanges have experienced rapid growth with stock price increases in all countries over the period of the study. The market capitalization for all GCC states increased from US\$120 billion in 2002 to US\$1000 billion in 2006, with increases ranging from 60% to 500%. The volume of shares traded increased between six to ten times during the period of the study (GCC, 2003, 2007), indicating significant expansion in the capital markets.

To capitalize on their domestic wealth, governments have undertaken economic reforms including an "open" economic policy. For example, privatization of state enterprises began in 1995 and the lifting of investment restrictions in the 1990s has attracted foreign investment. The rapid growth and opening up of capital markets in the GCC member states along with pressure from multinational corporations has led the governments to adopt IASs, in the expectation that adoption would meet demands by local and international investors for more detailed and comparable financial reporting (Al-Basteki, 2000; Azzam, 1998; Hassan, 1998; Hussain, Islam, Gunasekaran, & Maskooki, 2002; Shuaib, 1999). Regulation flows mainly from the governments of members states, as they have the power to create and

enforce accounting laws (Shuaib, 1999). In contrast to western countries, the accounting profession is in its infancy in GCC nations. It has little power to licence auditors or encourage compliance with accounting standards.²

2.1. Effect of regulatory framework on compliance

Prior studies investigating IASs adoption report that differences between companies in their level of compliance reflect their country of origin (Tower et al., 1999; Street & Bryant, 2000; Street & Gray, 2001), implying that there are important features in national financial-reporting frameworks which affect compliance. A country's financial reporting framework (that is, the laws and practices which govern financial reporting) has a key role in specifying financial-reporting requirements, in establishing a due process for monitoring and enforcing accounting standards, and in influencing the extent of compliance with those standards.

Table 1 outlines the regulatory framework for each of the six countries included in this study in the period 1996–2002. The countries share many common features, as shown in panel A. Company law required that audited financial statements be prepared and submitted to a government department. Enforcement bodies (government departments, stock exchanges, or central banks) were in place and the law provided penalties for noncompliance. Auditors were required to be licensed and could be subject to penalties for breach of company law.

However, there are also differences among the six countries, as shown in panel B. IASs were adopted for all companies in Bahrain, Kuwait, and Oman but only for banks and finance and investment companies in Saudi Arabia, Qatar, and the UAE. Adoption dates differed, with compliance with IASs required for all companies in Bahrain, Kuwait and Oman from 1986, 1991, and 1996, respectively. In Saudi Arabia, Qatar and the UAE adoption was in 1992, 1999, and 1999, respectively. Four countries (Bahrain, Oman, Kuwait, and the UAE) required the use of International Auditing Standards (ISA). Two countries (Kuwait and Saudi Arabia) had examinations for admission as auditors and three (Oman, Saudi Arabia, and the UAE) had professional training requirements. Three countries (Kuwait, Saudi Arabia, and Qatar) made use of two auditors, the UAE used three, and one auditor was the norm in Bahrain and Oman. Although all states had enforcement bodies, the extent to which they checked compliance with IASs differed. Only Kuwait, Oman, and the UAE had some degree of proactive surveillance programs which investigated company compliance. Regulators in the other countries relied primarily on the audit report. In addition, only Kuwait and Oman had pursued actions against firms for breach of reporting requirements.³

Professional accounting bodies exist only in four states, namely, Bahrain, Kuwait, the UAE, and Saudi Arabia. With the exception of Saudi Arabia, the bodies do not have any power in relation to licensing auditors or enforcing accounting regulations.

KUWAIT—two cases in 2001: an auditor gave an unqualified audit report for a company that had violated IAS requirements and was cautioned by a national disciplinary committee, and the Surveillance Department of the Ministry of Commerce received a shareholder complaint which led to the dismissal of the board of directors, the company's general manager, and the external auditor. **OMAN**—four cases in the period 1998–2003. In 1999 and 2001 two auditors were accused of failing to notify a violation of an accounting regulation and received warnings from the national disciplinary committee. The Oman securities regulator uncovered two cases of noncompliance with IASs. Company directors were found to have provided misleading and inadequate disclosure and were imprisoned (Al-Shammari, Brown, & Tarca, 2007).

Table 1
Financial reporting requirements and enforcement proxy for GCC countries

	Bahrain	Oman	Kuwait	Saudi Arabia	Qatar	UAE
<i>Panel A: Legal framework</i>						
Company law requires production of financial statements	Yes	Yes	Yes	Yes	Yes	Yes
Financial statements are submitted to government department	Yes	Yes	Yes	Yes	Yes	Yes
Penalties can be applied for breach of company law	Yes	Yes	Yes	Yes	Yes	Yes
Enforcement body in place (government department, stock exchange, or central bank)	Yes	Yes	Yes	Yes	Yes	Yes
Financial statements are audited	Yes	Yes	Yes	Yes	Yes	Yes
Auditors are licensed	Yes	Yes	Yes	Yes	Yes	Yes
Penalties can be applied if auditors breach regulations	Yes	Yes	Yes	Yes	Yes	Yes
<i>Panel B: Enforcement proxy</i>						
<i>Legal</i>						
IASs used by all companies	1	1	1	0	0	0
Adoption IASs prior to 1998	1	1	1	1	0	0
Directors/Officers can be prosecuted for noncompliance	1	1	0	1	1	1
<i>Audit</i>						
ISA used	2	2	2	0	0	2
Auditor examination	0	0	2	2	0	0
Auditor training	0	2	0	2	0	2
Two (or more) auditors	0	0	2	2	2	2
<i>Enforcement body</i>						
Enforcement body checks compliance	0	3	3	0	0	3
Enforcement body has taken action for noncompliance	0	3	3	0	0	0
TOTAL	5	13	14	8	3	10

Source: Al Shammari, Brown, and Tarea (2007). IASs = 1 if all companies use International Accounting Standards. Adoption = 1 if country adopted IASs prior to 1998. Directors/Officers can be prosecuted for noncompliance = 1 if directors or officers can be subject to legal action and penalties for non-compliance with accounting standards. ISA = 2 if auditors use International Auditing Standards. Auditor examination = 2 if auditors undergo an examination prior to admission to the profession. Auditor training = 2 if auditors must meet professional training requirements. Two or more auditors = 2 if company has more than one auditor. Enforcement body checks compliance = 3 if stock exchange, government body, or central bank reviews financial statements for compliance. Enforcement body has taken action for noncompliance = 3 if the stock exchange, government body, or central bank has taken action in relation to noncompliance with accounting standards. All information relates to the period 1998–2002. Weighting reflects the relative importance of the roles of independent auditors and enforcement bodies in promoting compliance (SEC, 2000; FEE, 2001; CESR, 2003; Schipper, 2005).

We predict that these differences in national frameworks will give rise to between-country differences in level of compliance. Our reasoning is as follows. The sample countries have many features in common in their regulatory frameworks, in addition to economic and cultural ties. This closeness could suggest that levels of compliance will be similar. However, it has been proposed that the roles of external auditors and independent enforcement bodies are crucial in promoting compliance with accounting standards (SEC, 2000; FEE, 2001; Schipper, 2005). Studies report that compliance is greater for companies with higher quality audits, proxied by having Big 4 auditors and using international auditing standards (Street & Bryant, 2000; Street & Gray, 2001; Glaum & Street, 2003). Since we have identified important differences between the countries in relation to the

activities of auditors and enforcement bodies, we propose that these differences will lead to between-country variation in the level of compliance. Our research proposition can be formally stated as:

Compliance is greater in GCC countries which feature higher audit quality and more activity by enforcement bodies.

In general, the level of compliance with IASs is expected to have increased over time in the GCC region because enforcement activities have increased in all member states. For example, at least two external auditors have been required to audit companies' accounts in Qatar, Saudi Arabia and the UAE. In Bahrain, shareholders have recently begun to question instances of a possible violation of IASs or other regulations. This suggests that they may have become more aware of and more willing to pursue their statutory rights. In Oman, Kuwait, and the UAE, the enforcement bodies have become more active in monitoring companies' compliance with IASs and other regulations in recent years.

2.2. Company factors affecting compliance

The agency-theory framework of Jensen and Meckling (1976) proposes that reducing information asymmetry between company insiders (managers) and providers of capital (outsiders) lowers agency costs (monitoring, bonding, and residual loss). The aim of reducing agency costs provides an incentive for adopting IASs, since adoption leads to greater disclosure and more transparency compared to the situation under national GAAP (Ashbaugh & Pincus, 2001; Barth, Landsman, & Lang, 2008). However, to maximize benefits from adopting higher quality standards, companies must also demonstrate compliance with the standards. The motivation to seek benefits from compliance may vary systematically between firms, based on their individual attributes. We explore below a number of company attributes which could be related to level of compliance.

Larger companies are more visible and, therefore, may be more likely to comply with accounting standards. Watts and Zimmerman (1978) and Holthausen and Leftwich (1983) argue that larger companies act to protect their reputation and avoid government intervention. While the authors base their ideas on developed markets, they also apply in the GCC countries where large companies are politically visible and economically important. Recent privatizations of large state-owned companies mean that they are a focus of government and investor attention. In addition, larger companies have more resources to spend on compliance and are less likely to be affected by disclosure of proprietary information than smaller companies. Another relevant point is that larger companies may be older, with more established reporting systems, meaning that compliance is less costly for them.

Further, larger companies are likely to be more international, that is, to have more foreign investors, foreign sales, or to have foreign stock exchange listings. Street and Brvant (2000), Street and Gray (2001), and Glaum and Street (2003) show that companies which are cross-listed have higher levels of compliance. In the GCC setting companies are not cross-listed outside the region; however, they do seek foreign investors. This may provide an incentive for greater compliance, to make financial reporting more transparent and comparable and to increase the company's credibility.

Companies with higher leverage can be expected to disclose more information to reduce costs, to reassure debtholders that their interests are protected. In the GCC setting,

banks play a dominant financial role in the economy (Al-Shimmiri, 2003; Azzam, 1998; Oweiss, 2000) and have substantial and enduring financial relationships with companies. While banks may not need to rely on public information to the same extent as in, say, the United States of America, it can still be argued that companies with a higher level of leverage may be more likely to disclose additional information, in order to reduce agency costs and information asymmetry with shareholders.⁴ Companies with higher leverage have, by definition, relatively less equity and probably, in turn, fewer shareholders. Consequently, they are more likely to be subject to higher equity risk and, therefore, greater shareholder demand for information to assess both the probability their company will meet its debt obligations and the riskiness of future cash flows arising from their investments.

In the GCC member states, three shareholder groups typically have substantial equity ownership in companies listed on the GCC stock exchanges. These groups are the government and its agencies, dominant families, and institutional investors, all of whom may influence the level and quality of disclosure and the level of compliance with IASs. In the GCC member states, these groups are considered insiders because they usually have representatives on the companies' boards of directors and thus have better access to internal information.⁵ Therefore, we expect that companies with more insiders (that is, more closely held ownership) have less motivation to comply with IASs than companies with widely held share ownership.

A final factor which may be relevant is industry membership. Industry type may capture sensitivity to political costs not captured by other proxies that differ by industry (Ball & Foster, 1982; Bazley, Brown, & Izan, 1985; Watts & Zimmerman, 1986, p. 239). In this connection, Ball and Foster (1982) argue that industry type can be a more appropriate proxy for political-cost sensitivity than size. Accounting and disclosure practices are often observed to reflect industry commonalities. Malone, Fries, and Jones (1993) and Wallace, Naser, and Mora (1994), for example, propose that the adoption of industry-related practices may lead to differential levels of disclosure on similar items in financial reports published by companies in different industries. We expect that the finance sector companies (banking, investment, and insurance) will have higher compliance levels than other companies for several reasons. First, we expect that companies in a given industry will comply more closely with a particular IAS that is more applicable to their activities, such as the banking industry with IAS 30. Second, banks (and to a lesser extent investment and insurance companies) have a high public profile which may attract political costs. They have incentives to enhance their reputations and avoid regulatory intervention by demonstrating compliance with legal reporting requirements.

Proxies for company attributes are included in the regression models to investigate whether they are associated with compliance in the manner predicted by the theory and research outlined above. In summary, compliance is predicted to differ between countries and by industry and to increase with the company's size, leverage, internationality, ownership diffusion, and age.

⁴ Evidence of banks' and institutional investors' ability to access information directly from companies has been provided for Kuwait (Al-Shimmiri, 2003), Bahrain (Joshi & Al-Bastaki, 2000) and Oman (Abdulla, 1998).

⁵ See note 2.

3. Data and method

3.1. Sample selection

The aim of the study is to investigate the level of compliance with IASs in GCC countries during the period 1996–2002, the latter being the most recent year available when the data was collected. We chose 1996 as the starting point because by that year four of the six countries, Bahrain, Kuwait, Oman and Saudi Arabia had begun to use IASs. Qatar and the UAE adopted IASs in 1999, and the last year for which data were available when we began our study was 2002. Thus the majority of our data are collected for 1996, 1999, and 2002.

We were unable to collect data for every year of the six-year period due to the time involved in the hand collection of data.⁶ However, we did collect data for three other years to supplement our investigation. Since firms may not be fully compliant in the first year of adoption, we also recorded compliance in the second year of adoption in selected countries being 1997 in Bahrain and 2000 in Qatar and the UAE. In the Results section we describe how we control for the discontinuous years in the data set in the data analysis. A set of annual reports which covers the relevant years was sought for all companies listed in each country in 1996. After excluding 44 companies due to cross-listing within the region (seven in Kuwait), de-listing or being an Islamic institution, we have a final sample of 137 companies out of 156 (89%) (68.5% of the total population, Table 2).⁷

3.2. Descriptive statistics

Table 3 provides descriptive statistics for the sample companies. Mean size is US \$1560.4 million, ranging from US\$2.82 million to US\$29,313 million. On average, companies in Saudi Arabia are the largest (US\$11,245.16 million) and in Oman, the smallest (US\$193 million), reflecting the concentration of large banking-sector companies in Saudi Arabia, the UAE and Qatar. Leverage ranges from zero to 13.91, with a mean of 2.57. The figure of zero indicates that some companies effectively have no debt, while a ratio of 13.91 implies that the company has relatively little equity. Qatar, Saudi Arabia, and the UAE companies have higher leverage because their sample is limited to banks and investment companies. The proportion of foreign ownership ranges from zero to 0.59, with a mean of 0.04. This small mean indicates that the GCC member states were in the early

⁶ Data were hand collected from annual reports because they were not available on databases.

⁷ There were nine (4.5%) Islamic institutions listed on the GCC stock exchanges. They were excluded because they follow specific disclosure requirements and are exempt from following IASs. A further 28 companies (14%) were excluded because they were delisted for various reasons (liquidations, litigation, mergers, and other reasons) during the period of study, and their annual reports were either not issued or not available. A further 17 companies (8.9%) were excluded to avoid double-counting, since these companies are cross-listed on the Kuwait Stock Exchange (KSE) and their home stock exchange (one of the other GCC stock exchanges). Nineteen companies did not respond to two requests for annual reports or did not provide reports for all the required years and were therefore excluded from the sample. The 17 excluded Omani companies are relatively small firms, with mean size of US\$1.2 million (ranging from US\$3 million to US\$38 million. They are from a range of industry sectors (three from banking, one from insurance, two from insurance, six from manufacturing, and five from services).

Table 2
Sample selection

	Bahrain	Oman	Kuwait	Saudi Arabia	Qatar	UAE	Total	% of the total population
Companies listed on GCC stock exchanges on 31 December 1996	36	79	60	9*	6*	10*	200	100%
<i>Exclusions</i>								
Islamic institutions	(2)	0	(2)	(2)	(2)	(1)	(9)	4.5%
Delisted companies during the period of the study (1996–2002)**	(8)	(19)	(1)	0	0	0	(28)	14%
Cross-listed on GCC stock exchanges	0	0	(7)	0	0	0	(7)	3.5%
Companies receiving request	26	60	50	7	4	9	156	78%
Companies with data not available***	(1)	(17)	0	(1)	0	0	(19)	9.5%
Companies with usable data included in the study	25	43	50	6	4	9	137	68.5%
Companies' annual reports collected (1996–2002)	100	129	150	18	12	27	436	

*This number represents only companies in the banking and investment industries because they are the only companies in Saudi Arabia, Qatar and the UAE that must adopt IASs.

**Liquidations, mergers, and other reasons not provided.

***Companies did not respond to two requests for their annual reports

stages of attracting foreign investors. Saudi Arabian companies have the highest proportion of foreign ownership (a mean of 0.25) and the lowest mean was Qatar (zero) as Qatar had not yet opened its share market to direct ownership by foreign investors.⁸ Institutional ownership (ownership diffusion) ranges from zero to 0.80, with a mean of 0.26 for the whole sample. Kuwait has the highest institutional ownership (mean 0.36) and Saudi Arabia the lowest (0.11). Company age ranges from one to 50 years, with a mean of 21.59.

Table 4 (panel A) reports correlations between the continuous independent variables. There is a significant positive association (1% level) between size and leverage (0.736), internationality (0.345), and age (0.414) and between leverage and internationality (0.306). Significant negative correlations (1% level) are observed between ownership diffusion and size (−0.198) and internationality (−0.214). Companies with Big Five auditors (390 of 436 annual reports) are more likely to be larger, older, more international, and to have higher leverage and greater ownership diffusion (Table 4, panel B).

The industry classification of the sample is 58 banking and investment companies, eight insurance companies, 38 manufacturing companies, and 33 service-industry companies, reflecting the strong representation of financial services in the GCC member states. Due to differences in the nature and operations of financial services (banking and investment and insurance) and other firms (manufacturing and service) we create two groups for analysis. Table 4, panel B shows that, overall, companies from the banking and investment and insurance sectors are larger, older, and have higher leverage.

⁸ In Qatar, foreign investors have been able to invest indirectly in national companies listed on the Doha Securities Market (DSM), via an investment fund, since 2001. Since April 2005, foreigners have been permitted to trade unconditionally on the DSM (DSM, 2005).

Table 3
Descriptive statistics

	Mean	Median	Minimum	Maximum	Std. Dev.
<i>All countries (N = 436)</i>					
Company size (US\$ million)*	1560.40	111.31	2.82	29313.00	3837.22
Leverage	2.57	1.01	0.00	13.91	3.15
Internationality	0.04	0.01	0.00	0.59	0.11
Ownership diffusion	0.26	0.20	0.00	0.80	0.22
Age	21.59	9.38	1.00	50.00	9.36
<i>Bahrain (N = 100)</i>					
Company size (US\$ million)	1486.96	69.67	10.55	29313.00	4944.27
Leverage	2.12	0.52	0.00	12.13	3.04
Internationality	0.08	0.01	0.00	0.59	0.17
Ownership diffusion	0.16	0.09	0.00	0.63	0.17
Age	21.59	21.00	2.00	45.00	8.32
<i>Oman (N = 129)</i>					
Company size (US\$ million)	193.59	26.49	2.82	4011.53	552.04
Leverage	2.13	1.14	0.05	13.91	2.52
Internationality	0.02	0.01	0.00	0.36	0.06
Ownership diffusion	0.29	0.27	0.00	0.79	0.24
Age	14.85	15.00	1.00	29.00	6.91
<i>Kuwait (N = 150)</i>					
Company size (US\$ million)	983.59	177.16	13.60	17376.44	2370.83
Leverage	1.64	0.73	0.02	10.10	2.39
Internationality	0.01	0.01	0.00	0.02	0.02
Ownership diffusion	0.36	0.36	0.00	0.80	0.22
Age	26.30	25.00	9.00	50.00	8.72
<i>Saudi Arabia (N = 18)</i>					
Company size (US\$ million)	11245.16	10548.49	2621.94	20547.00	5240.57
Leverage	8.73	8.49	6.38	11.48	1.62
Internationality	0.25	0.30	0.00	0.40	0.15
Ownership diffusion	0.11	0.10	0.00	0.19	0.04
Age	24.50	22.00	16.00	45.00	8.54
<i>Qatar (N = 12)</i>					
Company size (US\$ million)	2731.60	1452.90	592.18	8531.85	2745.00
Leverage	7.91	8.04	4.68	13.26	2.46
Internationality	0.00	0.00	0.00	0.00	0.00
Ownership diffusion	0.19	0.20	0.10	0.24	0.04
Age	25.08	23.50	16.00	38.00	7.51
<i>United Arab Emirates (N = 27)</i>					
Company size (\$US million)	4590.21	5440.50	110.95	10632.03	347.82
Leverage	5.08	5.37	0.04	10.87	3.15
Internationality	0.04	0.01	0.00	0.02	0.01
Ownership diffusion	0.13	0.07	0.01	0.82	0.21
Age	24.11	23.00	4.00	39.00	9.50

Table 4
Bivariate relationships among explanatory variables

	Company size	Leverage	Internationality	Ownership diffusion	Age
<i>Panel A</i>					
Leverage	0.36**				
Internationality	0.345**	0.306**			
Ownership diffusion	−0.198**	−0.206**	−0.214**		
Age	0.414**	0.176**	0.002	0.125*	1
<i>Panel B</i>					
Big Five auditor	133.21	1.25	0.01	0.21	21.00
Non Big Five auditor	33.77	0.23	0.001	0.08	18.50
Wilcoxon Probability	0.001	0.001	0.001	0.001	<0.001
Banks, investment, finance and insurance	966.11	3.89	0.001	0.18	22.00
Manufacturing and service	41.37	0.53	0.001	0.24	20.50
Wilcoxon Probability	0.001	<0.001	0.094	0.111	0.021

Panel A shows the Pearson correlation coefficients for continuous variables. Panel B shows median values and Wilcoxon statistics comparing firms based on auditor (Big Five or not) and industry (banking and investment and insurance or manufacturing and service). Company size = log of total assets, Leverage = ratio of book value of total debt to book value of total equity, Internationality = ratio of number of shares owned by foreign investors to total shares at year-end, Ownership diffusion = ratio of number of shares owned by institutional investors to total shares at year-end, and Age = number of years since foundation. ** Significant at 0.01 level (two-tailed). * Significant at 0.05 level (two-tailed).

3.3. Measuring compliance

Compliance with IASs is measured using a self-constructed compliance index, consistent with prior compliance studies (Tower et al., 1999; Street & Gray, 2001; Street & Bryant, 2000; Glaum & Street, 2003). The checklist is based on 14 standards: IAS 1, 10, 14, 16, 18, 21, 23, 24, 27, 28, 30, 32, 33 and 37. All IASs were initially considered for inclusion in the checklist, however some were excluded because (1) they were not applicable to GCC companies (IAS 12, 15, 19, 26, 29, 34, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100), (2) they were not applicable in the study period (IAS 39) or (3) there was little or no within-sample variation (IAS 2 and 7) or little or no disclosure (IAS 8). The Appendix A provides further details.

The checklist distinguishes between disclosure and measurement requirements because compliance may differ between them (Street & Gray, 2001). Table 5 shows the number of disclosure and measurement items in the checklist in total and for each year of the study. The checklist (available from the authors) was validated by comparison with checklists

Notes to Table 3

Company size = log of total assets, Leverage = ratio of book value of total debt to book value of total equity, Internationality = ratio of number of shares owned by foreign investors to total shares at year-end, Ownership diffusion = ratio of number of shares owned by institutional investors to total shares at year-end, and Age = number of years since foundation.

*In the regression models, company size was operationalized as the natural logarithm of total assets.

Table 5

Total number of disclosure and measurement items for each standard

Standards (effective year)	Total items	Disclosure items	Measurement items
IAS 1 (1975)	2	2	
IAS 1 (1998)	35	35	
IAS 10 (1980)	11	7	4
IAS 10 (2000)	7	5	2
IAS 14 (1983)	14	14	
IAS 14 (1998)	23	23	
IAS 16 (1995)	24	16	8
IAS 18 (1995)	3	3	
IAS 21 (1995)	20	9	11
IAS 23 (1995)	5	3	2
IAS 24 (1986)	5	5	
IAS 27 (1990)	12	7	5
IAS 28 (1990)	9	7	2
IAS 30 (1991)	45	45	
IAS 32 (1996)	10	10	
IAS 33 (1998)	8	5	3
IAS 37 (1999)	14	12	2
Maximum (1996)	160	128	32
Maximum (1997)	160	128	32
Maximum (1999)	224	187	37
Maximum (2000)	220	185	35
Maximum (2002)	220	185	35

Note: IAS 30 applies only to banks and financial institutions

used by Ernst & Young and KMPG in Kuwait. In addition, its validity and comprehensiveness were confirmed through a review by an external auditor from Kuwait.

Since several different reporting years for each member state were covered in this study, a range of standards were applicable in each member state. Each standard's applicability to companies' annual reports was determined and the relevant portions of the checklist were used in data collection.⁹ The requirements of selected IASs were not constant during the study period. The Comparability Project was completed in March 1999 and resulted in the revision of ten standards, three of which were included in this study (IASs 1, 10, and 14). For example, in IAS 1 the specificity of disclosure items was increased and in IAS 14 nine additional disclosure items were added (Murphy, 2000; IASC, 1996; IASB, 2002). We accommodated these changes by adjusting the compliance checklists to include any new measurement and disclosure requirements at the date they were applicable.¹⁰

For example, IAS 1, Disclosure of Accounting Policies, was in effect from 1 January 1975 until its replacement by IAS 1, Presentation of Financial Statements, from 1 July 1998. Therefore, for the purposes of this study, companies' annual reports were checked for compliance with the original IAS 1 in 1996 and 1997, while reports for 1999, 2000 and 2002 were checked against its replacement. The scoring procedure takes account of such differences in requirements over time, by expressing the compliance index in ratio form.

The coverage was as follows: IAS 1, old version 1996 and 1997, new version 1999, 2000 and 2002, IAS 10, old version 1996–1999, new version 2000–2002, IAS 14, old version 1996 and 1997, new version 1999, 2000, and 2002.

The full annual report was read and data collected by one researcher to ensure consistency in coding. Each disclosure item on the checklist was assigned a value of one if it was disclosed and zero if the item obviously applied but was not disclosed. Items obviously not applicable were coded as NA. Items for which not enough information was given to discern their applicability were coded as DK for “do not know.” The primary index is an overall compliance measure, excluding NA and DK items, and comprising a disclosure and a measurement-compliance measure. Robustness tests were completed to determine the sensitivity of the results to the treatment of the potentially ambiguous NA and DK items. Items in the checklist were not weighted because this process can introduce subjectivity and bias (Cooke, 1989, 1991; Wallace & Nasser, 1995).

The reliability of coding was verified by having a random selection of companies coded by a second coder (an auditor from a Big 5 firm in Kuwait) using the same checklist. The coding was completed for 144 company-years (30% of the sample), selected from all countries and a range of industries. The ratio of agreement of compliance scores (number of companies where the coders agree on score/total number of companies) between the two coders was 122/144 or 85%, indicating that the reliability of measurement of compliance is acceptable (Hackston & Milne, 1999).

3.4. Regression models

Multivariate analysis was used to investigate differences between countries in compliance levels as well as time trends and relationships between the level of compliance and company attributes. Since the dependent variable (the score for the compliance index) lies between zero and one, it was transformed by taking the logarithm of the “odds ratio” (Fox, 1997, p. 151; Hanushek & Jackson, 1977, pp. 187–189). If the overall level of compliance with IASs for a company is given by P , the logarithm of the odds ratio Y is given by:

$$Y = \text{Log} \left(\frac{P}{1-P} \right)$$

This transformation has been used in prior disclosure studies (Ahmed, 1996; Ahmed & Nicholls, 1994; Inchausti, 1997; Makhija & Patton, 2004). Data for the independent variables was obtained from companies' annual reports or from annual companies' guides published by the stock exchanges. The full model is set out in Eq. (1). The dependent variable is the compliance level of the company in a given year and there are up to 15 explanatory variables (plus a constant term.) Company-year subscripts are omitted from Eq. (1) for convenience:

$$Y = \beta_0 + \sum_{i=1}^{i=15} \beta_i X_i + \varepsilon \quad (1)$$

where:

Y compliance index score

β_0 constant term

X_1 one if company is from Bahrain, zero otherwise

X_2	one if company is from Oman, zero otherwise
X_3	one if company is from Kuwait, zero otherwise
X_4	one if company is from Saudi Arabia, zero otherwise
X_5	one if company is from UAE, zero otherwise
X_6	one if observation is from 1996, zero otherwise
X_7	one if observation is from 1997, zero otherwise
X_8	one if observation is from 1999, zero otherwise
X_9	one if observation is from 2000, zero otherwise
X_{10}	Company size (log of total assets)
X_{11}	Leverage (total debt/total equity)
X_{12}	Internationality (number of shares owned by foreign investors/total shares issued at year end)
X_{13}	Ownership diffusion (number of shares owned by institutional investors/total shares issued at year end)
X_{14}	Age (number of years since foundation)
X_{15}	one if company is from the finance industry, zero otherwise
ε	Error term.

4. Results

4.1. Level of compliance

The level of mandatory compliance (measurement and disclosure) with the 14 IASs, averaged over all companies and all years, was 0.75. The mean level of disclosure compliance was 0.69 and measurement compliance was 0.81. The level of compliance averaged over all companies increases over time, from 0.68 in 1996 to 0.82 in 2002 (Table 6). This indicates that compliance with IASs has been improving in the region; however, no company in any year within the study period fully complied with all relevant IASs.

The level of compliance with IASs differs between the GCC member states. The highest average compliance level over all years sampled is found in the UAE (0.80). This is followed by Saudi Arabia (0.78), Kuwait (0.75), Oman (0.74), Bahrain (0.73), and Qatar (0.70) (Table 6). Differences in median compliance are shown in Table 7 with Bahrain and the UAE greater than Qatar, Bahrain greater than Oman, and Oman greater than Saudi Arabia, although the differences are significant only at the 10% level. Kuwait is greater than Qatar at the 5% level.

Table 1 (panel B) provides a ranking of the audit and enforcement function in each country, based on features which could promote compliance. Countries score one for each of total legal features (IASs used by all companies; Adoption IASs prior to 1998; Directors/Officers can be prosecuted for non-compliance), two for items which promote quality of audit (ISA used, Auditor examination; Auditor training; Two or more auditors), and three for proactive enforcement and follow-up action (Enforcement body checks compliance; Enforcement body has taken action for non-compliance). The weighting reflects our judgment of the relative importance of law, quality of audit, and activities of enforcement bodies in promoting compliance, derived from prior literature (SEC, 2000; FEE, 2001;

Table 6
Mean compliance scores by country and year

Country	Total compliance	Disclosure compliance	Measurement compliance	Country	Total compliance	Disclosure compliance	Measurement compliance
	Mean	Mean	Mean		Mean	Mean	Mean
Total (N=436)							
1996	0.68	0.56	0.80				
1997	0.71	0.63	0.80				
1999	0.74	0.69	0.80				
2000	0.76	0.73	0.80				
2002	0.82	0.80	0.84				
All years	0.75	0.69	0.81				
Bahrain (N=100)				Saudi Arabia (N=18)			
1996	0.69	0.56	0.81	1996	0.72	0.65	0.80
1997	0.71	0.63	0.79	1999	0.76	0.74	0.80
1999	0.74	0.70	0.82	2002	0.88	0.85	0.91
2002	0.80	0.74	0.88	All years	0.78	0.75	0.83
All years	0.73	0.65	0.82				
Oman (N=129)				Qatar (N=12)			
1996	0.65	0.50	0.80	1999	0.64	0.62	0.67
1999	0.73	0.64	0.82	2000	0.67	0.68	0.65
2002	0.83	0.80	0.85	2002	0.81	0.79	0.83
All years	0.74	0.65	0.82	All years	0.70	0.69	0.71
Kuwait (N=150)				UAE (N=27)			
1996	0.68	0.60	0.75	1999	0.74	0.65	0.82
1999	0.76	0.74	0.79	2000	0.80	0.75	0.86
2002	0.81	0.81	0.81	2002	0.86	0.84	0.91
All years	0.75	0.72	0.78	All years	0.80	0.75	0.85

CESR, 2003; Schipper, 2005). The countries are ranked as follows: Kuwait=14, Oman=13, the UAE=10, Saudi Arabia=8, Bahrain=5 and Qatar=3. The relationships of compliance scores (Table 7) are consistent with the ranking provided by the enforcement scores, except for one case. The comparison of median compliance scores shows Bahrain is significantly higher than Oman while the enforcement ranking places Oman ahead of Bahrain.¹¹ However, Table 7 shows that for ten out of 15 pairs of countries (67%) compliance scores are not significantly different. The relationships of compliance scores are explored further in the multivariate analysis below.

With respect to disclosure compliance, the UAE and Saudi Arabia both averaged 0.75, followed by Kuwait (0.72), Qatar (0.69), and Bahrain and Oman (both 0.65). The highest level of measurement compliance was again in the UAE (0.85), Saudi Arabia (0.83),

¹¹ The enforcement ranking is also calculated on an unweighted basis, where each item in Table 1, panel B is scored as one or zero. The unweighted country scores are as follows: Oman=7, Kuwait=7, Saudi Arabia=5, UAE=4, Bahrain=4 and Qatar=2. The country ranking is similar when unweighted scores are used, although Saudi Arabia ranks ahead of the UAE.

Table 7

Differences in median overall compliance between countries

	Bahrain	Oman	Kuwait	Saudi Arabia	Qatar
Oman	<0.065*				
Kuwait	0.496	0.432			
Saudi Arabia	0.609	0.010*	0.618		
Qatar	<0.072*	0.137	<0.030**	0.264	
UAE	0.486	0.290	0.510	0.803	>0.090*

This table shows significant differences (based on *t*-tests) between the overall all-years median compliance score reported in Table 6 for each pair of countries. The < and > symbols indicate that compliance was lower/higher in the country identified at the start of each row. ** Significant at the 0.05 level (two-tailed).

*Significant at the 0.10 level (two-tailed).

Bahrain and Oman (both 0.82), Kuwait (0.78) and Qatar (0.71). Overall, measurement compliance was better than disclosure compliance for all years and the increase in compliance was relatively greater for disclosure items. Compliance levels of 80% for disclosure and 84% for measurement were achieved in 2002 (Table 6).

The level of compliance varied across standards. The highest average level of compliance for all years was 0.89 for IAS 18, and the lowest was 0.43 for IAS 37. The compliance level was highest for IAS 1, 16, 18, 23, 24, 27, and 30 (averaging more than 0.80); whereas, it was lowest for IAS 14 and 37 (less than 0.50). Moderate compliance was found for IAS 10, 21, 28, 32, and 33 (more than 0.50 and less than 0.80). In general, the level of compliance increased from 1996 to 2002 for all standards, indicating that the GCC states, collectively, were progressing towards achieving greater *de facto* harmonization with IASs. A possible explanation for the higher level of compliance with IAS 1, 16, 18, 23, 24, 27, and 30 is that they are less difficult to implement when compared with IASs with requirements to disclose more proprietary information or with more complicated requirements, such as IAS 14 and 37.

4.2. Regression results

Model I of Table 8 shows results for the overall compliance index excluding NA (not applicable) and DK (do not know) items. The model is significant overall ($F=21.664$, $p=0.001$) with R^2 (adj.) of 0.432. The results reveal that, as predicted, the level of compliance with IASs exhibits a home-state effect and increases with a company's size, leverage, and internationality.¹² There are significant differences in the level of compliance across years with compliance in 1996, 1997, and 1999 being lower than 2002 (the omitted dummy variable).

Level of compliance is significantly different between the countries. Average compliance in Qatar is reflected in the constant term, showing that compliance in the

¹² Table 4 shows a correlation of 0.736 for size and leverage. In Model I VIF scores are 5.194 for size and 3.344 for leverage, suggesting that both variables can be included in the model.

Table 8
Regression results: Compliance with IASs

Independent variables	Coefficients				
(Expected sign)	Model I	Model II	Model III	Model IV	Model V
Constant	−0.615***	−0.338**	−0.671***	−0.219*	−0.205**
Bahrain (+)	0.299+++		0.307+++		
Oman (+)	0.197+++	−0.082(a)	0.210+++		
Kuwait (+)	0.173+++	−0.107(a)	0.179+++		
Saudi Arabia (+)	0.108++		0.099+		
UAE (+)	0.104++		0.122++		
Enforcement (+)					0.008(a)
Year (1996) (−)	−0.255+++	−0.229+++	0.255+++	−0.244+++	−0.247+++
Year (1997) (−)	−0.254+++	−0.223+++			−0.209+++
Year (1999) (−)	−0.220+++	−0.194+++	−0.219+++	0.247	−0.222+++
Year (2000) (−)	−0.067+				−0.197+++
Kuwait/Oman (+)				−0.068(a)	
Kuwait/Oman*1996 (+)				−0.006	
Kuwait/Oman*1999 (+)				0.035	
Company size (+)	0.081+++	0.078+++	0.086+++	0.064+++	0.067+++
Leverage (+)	0.009++	0.007+	0.009++	0.003	0.004
Internationality (+)	0.193+++	0.260+++	0.198+++	0.267+++	0.255+++
Ownership diffusion (−)	0.048	0.054	0.049	0.030	0.039
Age (+)	0.002+	0.002++	0.002+	0.002++	0.002++
Industry (+)	−0.043(a)	−0.040	−0.051(a)	−0.044	−0.037
Adjusted R^2	0.432	0.400	0.440	0.398	0.396
F	21.664	23.183	23.645	23.450	25.281
Prob. (F)	<0.001	<0.001	<0.001	<0.001	<0.001
No. of companies	137	118	137	137	137
No. of observations	409	367	375	375	409

This table presents the results of regression models that examine the relationship between level of compliance and independent variables. Model I includes all countries and years. Model II includes companies from Bahrain, Oman and Kuwait, where all companies adopted IASs. Model III includes the major years for data collection 1996, 1999 and 2002. Model IV includes country-year interaction terms for the major years of data collection and the countries with the highest enforcement scores (Oman and Kuwait). Model V includes a self-constructed enforcement proxy (see Table 1) instead of country variables. Company size = log of total assets; Leverage = ratio of book value of total debt to book value of total equity; Internationality = ratio of number of shares owned by foreign investors to total shares at year-end; Ownership diffusion = ratio of number of shares owned by institutional investors to total shares at year-end; and Age = number of years since foundation. Industry = 1 if banking and investment and insurance, 0 if manufacturing and service. In Models I and III the omitted country dummy variable is Qatar and the omitted year dummy variable is 2002. In Model III the omitted country variable is Bahrain. +++ significant $p < 0.01$ (one-tailed); ++ significant $p < 0.05$ (one-tailed); + significant $p < 0.10$ (one-tailed); *** significant $p < 0.01$ (two-tailed); ** significant $p < 0.05$ (two-tailed); * significant $p < 0.10$ (two-tailed); (a) Coefficient is statistically significant but sign is opposite to that predicted.

other five countries is significantly higher. Kuwait and Oman, countries with the highest enforcement ranking, are significant at the 1% level; Saudi Arabia and the UAE, countries with mid-level rankings on the enforcement proxy, are significant at the 5% level. Bahrain is also significantly different froms Qatar at the 1% level, although its enforcement score is only five compared to three for Qatar (Table 1). Overall, the multivariate results provide

support for the research proposition that compliance differs in the GCC countries in response to the quality of audit and the activity of enforcement bodies.¹³

Model II (Table 8) includes 118 companies (82% of the full sample) from the three countries where all companies use IASs (Bahrain, Kuwait, and Oman). The results are similar to Model I, presumably because of the large overlap in the data. In addition Model II shows that, contrary to predictions, being a company from Bahrain is associated with higher compliance (Kuwait and Oman are significant and negative) in the multivariate analysis. This result is not consistent with the enforcement proxy scores (Table 1, panel B) which suggests that in the regression model the country of domicile proxies for variables in addition to those included in the enforcement proxy.¹⁴

As outlined earlier, most observations in the study are drawn from the years 1996, 1999, and 2002. Model III includes only these years, with 2002 as the omitted dummy variable. The result confirms the trend observed in Model I, namely that compliance increases over the years of the study. We do not fit regressions based on panel data because the years of data are discontinuous. Instead we use interaction terms to further explore the impact of country and year. We expect that compliance increases over time and is higher for companies from Kuwait and Oman, which have the highest scores for the enforcement proxy.

Model IV includes three additional regressors: Kuwait/Oman (a dummy variable to indicate a company domiciled in either Kuwait or Oman), Kuwait/Oman*1996 and Kuwait/Oman*1999. In Model IV Kuwait/Oman is significant but the coefficient has the opposite sign to that predicted. This result reflects the mean compliance scores of Kuwait and Oman companies, compared to the other countries. As noted above in relation to Model II, despite the higher scores on the enforcement proxy, the two country dummy variables are not significant explanatory variables for compliance in multivariate analysis. The Kuwait/Oman effect is also present in the two interaction terms (Kuwait/Oman*1996 and Kuwait/Oman*1999), neither of which is significant in Model IV. The time effect is captured in dummies for 1996 and 1999, with the country/year interaction terms not adding significantly to the model.

Model V in Table 8 excludes the country dummy variables and includes the enforcement proxy (Table 1). The enforcement proxy is significant and negative, showing that it captures differences between the countries but the relationship is not in the direction predicted. The relatively high mean compliance scores in Saudi Arabia and the UAE (0.80 and 0.78 in Table 6), countries which have only mid-rank scores for the enforcement proxy, may

Robustness tests demonstrated that the regression results are not sensitive to alternative specifications of the dependent variable, that is, to the treatment of potentially ambiguous items in the checklist. Several measures of the dependent variable are investigated (regressions not reported in detail). First, the overall compliance index is calculated including NA and DK items, but recording NA and DK as noncompliance, thus giving a lower compliance score because all items were considered applicable and companies were penalized for not disclosing an item, irrespective of its applicability. Second, the overall compliance index is calculated including DK items, but recording DK as noncompliance and excluding NA items. Only companies with DK items received a lower score. Overall, the results reported in Model I (Table 8) are not especially sensitive to the alternative transformed compliance indices, despite some differences with respect to the significance of country and industry dummy variables. We also fit Model I using the untransformed dependent variables. The results are essentially unaffected. Third, the explanatory power of the transformed dependent variable models is slightly (1–3%) higher.

A separate regression model is not fitted for companies from Saudi Arabia, Qatar, and the UAE due to the small number of observations (Companies $n=19$, company-year observations=44).

partially explain why the predicted directional relationship is not observed. Like Model II, the Model V result implies that the enforcement scores lack discriminating power compared to country variables. However, as noted above, many of the country compliance scores are not significantly different in univariate tests. This lack of variation makes it more difficult for the enforcement proxy to explain the differences between countries.¹⁵

4.3. Summary and limitations

In summary, we find that the average level of compliance for all companies and all years is 75% of the items in the index. No company within the examined time period fully complied with all requirements. The average level of compliance increased over time, from 68% in 1996 to 82% in 2002. Notwithstanding strong cultural ties and cooperative economic relationships, there is significant variation in the level of compliance across the six GCC member states. The highest average level of compliance is in Saudi Arabia, where it reached 88% in the last year of the study. Compliance improved substantially in Kuwait and Oman from 1996 to 1999, more so than in the other GCC member states. This could, at least partially, have resulted from improved monitoring and enforcement in Kuwait and Oman beginning in 1999.

There were some changes to IASs during the period, as the IASC completed the Comparability Project and made some standards more prescriptive. Therefore, it should be noted that we report downwardly biased measures of improvement in compliance because our measures do not allow for the fact that compliance became progressively more demanding over the period. Nevertheless, our results suggest some weaknesses in compliance incentives in the region and indicate that there is scope for further improvement in national monitoring and enforcement mechanisms in the GCC member states.

Prior studies report a range of outcomes in relation to IASs compliance, which vary between countries, whether IASs are voluntary or mandatory and in relation to disclosure and measurement items. Direct comparisons of our results with those of prior compliance studies such as Tower et al., (1999), Glaum and Street (2003) and Street and Gray (2001) have not been made because such comparisons have questionable validity. One reason is that prior studies address other time periods, when a different set of IASs were applicable, which means that the compliance measures lack comparability. In addition, compliance measures reflect countries' institutional frameworks, which are known to differ between countries. Substantial differences between the settings of the current and prior studies may render direct comparisons of compliance scores of limited value.

5. Conclusions

We show that the level of mandatory compliance with IASs differed among companies from the Gulf Co-Operation Council (GCC) member states (Bahrain, Oman, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates) over the period 1996–2002. Although these countries had progressively made IASs mandatory for all or selected companies since 1996, and compliance improved over the period, no company achieved full compliance with

¹⁵ If the unweighted proxy for enforcement is used results are similar to Model V.

either IASs measurement or disclosure requirements during the period. Our study provides the first in-depth analysis of IASs compliance within a set of states with common interests in a politically and economically important region, and thus extends the literature about progress towards the international harmonization of financial reporting. The results suggest that there is scope for companies to improve their levels of compliance with IASs, to improve comparability among companies in the region and to facilitate the process of attracting international investors.

The IASB standards have been developed for use as national standards in countries throughout the world, irrespective of culture and level of economic development. Since wide-scale mandatory adoption is relatively recent, little is known about the effectiveness of IASs adoption in various countries. Exploring compliance in the GCC region is of interest because of distinctive features such as strong links between member states, developing-country status accompanied by considerable wealth, and significant cultural differences to many western countries. We show that adoption of IASs in the region is *de jure* but not *de facto*, that is, IASs are adopted by law but not in practice, as substantial noncompliance is observed. We also explore the relationship of compliance and each country's institutional setting, thus extending prior studies by exploring relevant elements of the national institutional frameworks, including the activities of auditors and enforcement bodies.

We find that despite noncompliance and the responsibilities of auditors under the law (which are similar to those observed in western countries), no action has been taken against an audit firm, member of the board of directors, or a manager for violating an accounting regulation, except for two cases in Oman and one in Kuwait. External auditors in the GCC member states reported a client company fully complied with all IASs even where that was clearly not the case. Our results suggest that although a set of mechanisms to promote compliance among GCC companies is in place, activities of enforcement bodies have been insufficient to ensure compliance. Possible reasons are a lack of professional training and payment of salaries to attract sufficiently qualified staff. Also, the enforcement bodies have other responsibilities and there may be a lack of commitment from governments, at a policy level, to enforcement. In the face of scarce resources, efforts might be more effective if focused on monitoring companies that are smaller, have fewer international investors, and borrow proportionately less. Thus, the findings may be relevant to national regulators and the Gulf Co-Operation Council Accounting and Auditing Organization (GCCAAO) in their efforts to harmonize financial reporting.

The evidence presented about practical outcomes of IASs adoption may be relevant in other countries which have recently made IASs mandatory. The financial reporting frameworks in the GCC countries are based on company-law requirements which are enforced through government departments and contain penalties for breach of requirements. The frameworks place extensive reliance on external auditors and feature only limited activity by stock exchanges and enforcement bodies in checking for compliance and taking action for non-compliance. As such, the frameworks have many similarities to those which have been operating in other countries (see for example, FEE's (2001) comparison of financial reporting frameworks in European countries). This study provides evidence of a lack of compliance in practice, despite the existence of many of the mechanisms considered necessary to promote compliance. Thus, the results may be insightful for regulators in other IASs adopting countries.

Appendix A. IASs included in compliance checklist

Fourteen IASs were included in the compliance checklist. Other standards were excluded for the following reasons:

(1) Standards not applicable in the GCC

Two procedures were used to verify the applicability of each standard. First, each IAS was discussed with two senior external auditors (employed by Ernst & Young and KPMG in Kuwait). These auditors confirmed which standards did not apply to GCC member states. Second, the coder checked for any disclosures relating to these standards when examining companies' annual reports. Five standards were omitted as not applicable: IAS 12, Income Taxes; IAS 15, Information Reflecting the Effects of Changing Prices; IAS 19, Employee Benefits; IAS 26, Accounting and Reporting by Retirement Benefit Plans, and IAS 29, Financial Reporting in Hyperinflationary Economies.

Further relevant information is as follows. IAS 12 was omitted because GCC companies pay no income tax, except in Oman. Since inflation has been relatively low (1.5% to 4% p.a.) over the last ten years and the purchasing power of money has been relatively stable over the last 20 years (GCC, 2003) IAS 15 and IAS 29 were considered not applicable. IAS 19 and IAS 26 do not apply because all companies operating in the GCC member states must follow labor laws with respect to accounting for employee benefits and retirement benefits. IAS 34 does not apply because we measure compliance with IASs in annual, not interim, reports.

(2) Not applicable in the study period

IAS 39, Financial Instruments Recognition and Measurement, although issued by the IASB, was not mandatory for companies during the study period.

(3) Little within-sample variation

A pilot study was conducted to determine the applicability of IASs to GCC companies. It reviewed 43 companies, 31% of the total sample of 137 (eight companies' annual reports representing all industries from each GCC member state). Companies were selected randomly, except for Qatar, Saudi Arabia, and the UAE, where all banks and finance and investment companies were examined. We found that IAS 11, Construction Contracts; IAS 17 Leases; IAS 20, Accounting for Government Grants and Disclosure of Government Assistance; IAS 22, Business Combinations; IAS 31, Financial Reporting of Interests in Joint Ventures; IAS 35, Discontinuing Operations; and IAS 38, Intangible Assets were only mentioned in a few of the annual reports, therefore, these standards were excluded.

The coder also examined if there was any disclosure based on the excluded standards when he investigated the full sample of companies' annual reports. The examination confirmed very few companies consistently disclosed information relative to these standards. IAS 11 applied to only one company, IAS 17 to five, IAS 20 to nine, IAS 22 to none, IAS 31 to six, IAS 35 to one and IAS 38 to one. This review supports the exclusion of the named standards from the compliance index.

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Does Convergence of Accounting Standards Lead to the Convergence of Accounting Practices? A Study from China

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Abstract

In this empirical study we examine whether China's efforts to converge domestic accounting standards with International Financial Reporting Standards (IFRS) over the past 15 years have resulted in the successful convergence of Chinese listed firms. This study is unique in that we evaluate convergence of firms' accounting practices from three perspectives: (1) the level of compliance with Chinese GAAP and IFRS, (2) the consistency of accounting choices under Chinese GAAP and IFRS, and (3) identification of significant differences in the net incomes produced under Chinese GAAP and IFRS (earnings gap).

Using the 1999 and 2002 annual reports of 79 Chinese listed firms we find improvement in both compliance with IFRS and in the consistency of the accounting methods used in annual reports prepared under Chinese GAAP and IFRS. We also find a reduction in the earnings gap from 1999 to 2002. However, interestingly we observed that Chinese listed firms' compliance with IFRS is significantly lower than their compliance with Chinese GAAP. Overall we believe that our findings suggest that in China the convergence of accounting standards has been a conduit to the convergence of accounting practices.

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Keywords: Accounting convergence; Accounting regulations in China; Capital markets in China; Emerging markets

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1. Introduction

The primary objective of the International Accounting Standard Board (IASB) is to develop a single set of high quality accounting standards for use in global financial reporting. To this end, the IASB and its predecessor have issued 41 International Accounting Standards (IAS) and seven International Financial Reporting Standards (IFRS).¹ As an integral part of its objective the IASB promotes the convergence of national accounting standards and IFRS. The IASB's efforts have resulted in the adoption of IFRS by a considerable number of countries. Among the 99 countries that have either adopted or permitted the use of IFRS for domestic listed companies as of August 2005, 80% are from emerging capital markets (Deloitte & Touche, 2005). Along with the IASB's success, however, there is concern that the convergence of accounting standards may not lead to the convergence of accounting practices if firms do not comply with the standards (Street, Gray, & Bryant, 1999; Street & Bryant, 2000). This concern is accentuated in emerging market economies that may not have the accountants, auditors, and regulators to support compliance. As pointed out by Eccher and Healy, the standards developed by the IASB are "primarily based on those for countries with highly developed capital markets... It is questionable whether such standards are also optimal for developing and transitional economies that lack the infrastructure for monitoring managers' financial reporting decisions" (p. 1).

In this empirical study we use China — as a case of an emerging market economy — to examine whether its efforts to converge domestic standards with IFRS over the last 15 years have been successful, i.e., do Chinese listed firms' accounting practices converge with IFRS? China provides a clear opportunity to evaluate the convergence debate. Since 1992, China has issued four sets of accounting regulations (1992, 1998, 2001, and 2006); each replaced the previous one and was considered to be in greater conformity with IFRS (Chen et al., 2002; Pacter & Yuen, 2001; IASB, 2006). It has been noted in the literature and by the IASB that impressive progress has been made toward the convergence of Chinese accounting standards with IFRS (IASB, 2005; Xiang, 1998). However, Chen, Gul, and Su (1999) and Chen et al. (2002) find that there is a significant difference in both 1992 and 1998 between Chinese GAAP and IFRS-based net incomes of Chinese listed firms. Our study extends Chen et al. (2002) by evaluating the level of and the improvement in the convergence of Chinese listed firms' accounting practices with IFRS since promulgation of the 2001 Chinese GAAP.

In addition, this study contributes to the literature by evaluating the convergence of accounting practices using three evaluation methods: (1) the level of a firm's compliance with accounting regulations, (2) the consistency of firms' accounting choices under two sets of accounting regulations, and (3) whether the net incomes produced by the same firm under different sets of accounting standards are comparable. Each of these methods evaluates different aspects of convergence. No previous study has integrated these three approaches, most likely due to the difficulty in obtaining suitable sample firms. We are able to study these evaluation methods because of China's unique market segmentation which

¹ To simplify the presentation, we use the term IFRS to refer to both International Financial Reporting Standards issued by the IASB and IAS issued by the IASB's predecessor, the International Accounting Standards Committee (IASC).

requires certain firms, those that issue both A and B-shares, to issue two sets of annual reports, one based on Chinese GAAP and the other based on IFRS.

We find that China's efforts to converge Chinese accounting standards with IFRS have been successful in the convergence of Chinese firms' accounting practices with IFRS. We also find that the convergence of accounting practices in China has occurred progressively as evidenced by the improvement in convergence with the issuance of Chinese GAAP in 2001. Although these findings are specific to China, they should also be of interest to regulators in other developing capital markets who seek to improve financial reporting through convergence of their standards with IFRS. Regulators in these countries face many of the same obstacles encountered by China, such as lack of accounting professionals, insufficient resources for regulation and enforcement, and questionable practices of local auditors.

The remainder of this paper is organized as follows: Section II provides the background and Section III presents prior research and hypotheses development. Section IV discusses the research design. Section V presents the results and Section VI provides a summary of the study.

2. Background

2.1. Chinese capital market development and market segmentation

The Chinese capital market developed rapidly since its establishment in the early 1990s. By the end of 2004, China's total market capitalization was approximately RMB3.71 trillion, or approximately \$464 billion U.S. dollars. This represents 24% of Gross Domestic Product (GDP).² The number of listed firms increased from 14 at the beginning of 1990 to 1377 by the end of 2004 (CSRC, 2005). This rapid market development, and the desire to attract domestic and overseas capital, provided direct incentives and pressures for both the Chinese government and listed firms to improve the quality of financial reporting.

The Chinese domestic capital market is segmented into A-share and B-share markets.³ A-shares can only be owned and traded by Chinese citizens, while B-shares can only be owned and traded by foreign investors.⁴ By the end of 2004, a total of 1463 stock offerings were made by the 1377 listed firms on Chinese capital markets — 1353 A-share issues, 24 B-share issues, and 86 A- and B-share issues (CSRC, 2005).

2.1.1. Accounting regulations

The accounting regulations applicable to a Chinese listed firm depend on the type of security issued, A- or B-shares or both. Firms that issue A-shares are required to comply with Chinese GAAP, while firms that issue B-shares are required to comply with IFRS. Firms that issue both A- and B-shares are required to issue two sets of annual reports, one based on Chinese GAAP and the other based on IFRS. The IFRS-based annual report must be audited by an internationally recognized auditor, but not necessarily a Big 4 firm, while the Chinese GAAP-based annual report may be audited by local accounting firms. Both sets of annual

² Chinese 2004 GDP was \$1.93 trillion in U.S. dollars (China Daily 2005).

³ H-shares, or H-shares called H-shares are listed in Hong Kong. Unlike A- and B-shares that are traded in the mainland, H-shares are traded in Hong Kong and subject to Hong Kong Accounting Standards (HKAS).

⁴ Since 2001 Chinese citizens have been allowed to purchase B-shares using U.S. dollars.

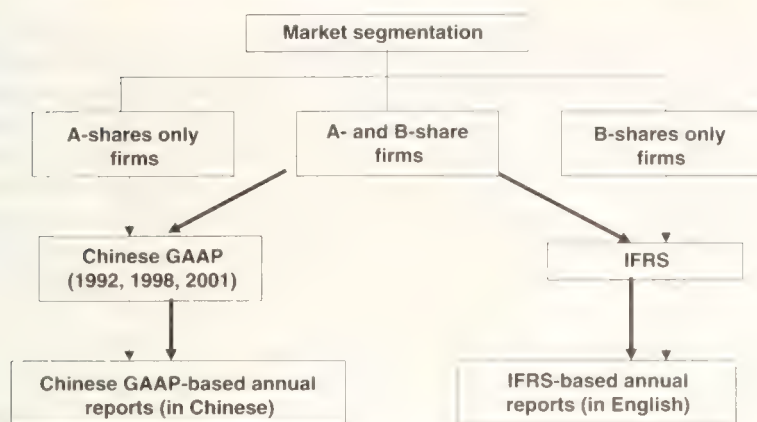


Fig. 1 Market segmentation and applicable accounting regulations in China as of December 31, 2005

reports must be released to the public simultaneously and any difference in net incomes between Chinese GAAP and IFRS must be reconciled and presented in the financial statement footnotes. Fig. 1 and Table 1 depict the Chinese capital market segmentation and the evolution of accounting regulations for Chinese listed A-share firms as of December 31, 2005.

While B-share firms have historically been required to follow IFRS, the accounting regulations for firms that issue A-shares have evolved in three stages as shown in Table 1. The first stage is from 1992 to 1997. Throughout this stage all listed A-share firms were required to follow the *Experimental Accounting System for Joint Stock Limited Enterprises* (1992

Table 1
Evolution of accounting regulations for listed A-share firms in China as of December 31, 2005

	Stage 1	Stage 2	Stage 3
Period	1992.1.1–1997.12.31	1998.1.1–2000.12.31	2001.1.1–2006.12.31
Accounting regulations in effect throughout the stage	1992 Accounting System ^a Basic Standard ^d CSRC Regulations ^c	1998 Accounting System ^b Basic Standard ^d CSRC Regulations ^c CASs ^f Accounting Law ^g	2001 Accounting System ^a Basic Standard ^d CSRC Regulations ^c CASs ^f Accounting Law ^g
Referred to in the study as	1992 GAAP	1998 GAAP	2001 GAAP

^a “Experimental Accounting System for Joint Stock Limited Enterprises” issued by the Ministry of Finance of China (MOF) in 1992.

^b “Accounting System for Joint Stock Limited Enterprises” issued by the MOF in 1998.

^c “Accounting System for Business Enterprises” issued by the MOF in 2001.

^d “Accounting Standard for Business Enterprises” issued by the MOF in 1992.

^e “Form and Content of Information for Disclosure by Companies with Securities Issued to the Public” and other regulations issued by the CSRC.

^f “Chinese Accounting Standard” issued by the MOF.

^g “Accounting Law of the People’s Republic of China” issued in 1995 and revised in 2000 by the State Council of China.

Accounting System) and the *Accounting Standard for Business Enterprises* (Basic Standard) issued in 1992 by the Ministry of Finance (MOF), as well as accounting regulations issued by the Chinese Securities Regulatory Commission (CSRC). The MOF is the authoritative body which promulgates accounting standards in China. The CSRC, established in 1992, is the capital market regulator in China whose authority and operations are analogous to those of the Securities and Exchange Commission (SEC) in the United States. In this study we refer to the accounting regulations that were issued in 1992 in China and were in effect throughout this period as 1992 Chinese GAAP. The 1992 Chinese GAAP marked a radical change in China's accounting rules and regulations, representing a shift in focus from providing information for a central government-planned economy to a socialist-market economy.

The second stage of regulatory development was from 1998 to 2000 and is represented by the adoption of the *Accounting System for Joint Stock Limited Enterprises* (1998 Accounting System) issued by the MOF. This regulation replaced the 1992 Chinese GAAP and “was issued specifically to eliminate discrepancies between Chinese GAAP and IAS in the 1992 regulation” (Chen et al., 2002, p. 184). In addition, during this period A-share firms were required to follow the *Chinese Accounting Standards* (CAS) issued by the MOF and the accounting law issued by the State Council in 1995. We refer to the accounting regulations that were in effect throughout this stage as 1998 Chinese GAAP.

The third stage of development was from 2001 to 2006,⁵ represented by the MOF's issuance of the *Accounting System for Business Enterprises* (2001 Accounting System) effective January 1, 2001, which replaced the 1998 Accounting System. We refer to the accounting regulations that were in effect during this period for A-share firms as 2001 Chinese GAAP. The 2001 GAAP moves Chinese accounting standards further toward convergence with IFRS (Pacter & Yuen, 2001). For example, inventory valuation at lower of cost or market (LCM) was optional in 1998 GAAP but required in 2001 GAAP and recognition of impairment losses was required only for investments in 1998 GAAP, but it was also required for property, plant, and equipment (PP&E), intangible assets, construction in process, and investment property in 2001 Chinese GAAP. These requirements, among others, moved Chinese GAAP toward convergence with IFRS. Table 2 compares the accounting treatment for selected key measurement items under 1998 and 2001 Chinese GAAP with IFRS. This comparison reflects the progress toward convergence.

3. Prior research and hypotheses development

Prior to 2001 the goal of the International Accounting Standards Committee (IASC), the predecessor of the IASB, was harmonization of accounting standards across countries through development of a set of standards that could be used as a model for standard setters in their respective countries. However, in 2001, when the IASB replaced the IASC, its goal became one of “convergence of accounting standards — development of a single set of high quality,

⁵ A revised Chinese GAAP effective on January 1, 2007 (2007 Chinese GAAP), was issued in February 2006. The 2007 Chinese GAAP, including revised Basic Standard and 38 CASs, supersedes the 2001 Accounting System and the CASs previously issued. It signifies the beginning of the fourth stage of China's regulatory development. The effect of the 2007 Chinese GAAP on the convergence of Chinese listed firms' practices with IFRS is beyond the scope of this study, as 2007 annual reports were not available at the time of this study.

Table 2
A comparison of eight revised accounting methods

Item	1998 Chinese GAAP	2001 Chinese GAAP	IFRS ^a
Inventory valuation	At historical cost or the lower of cost and net realizable value (LCM).	At LCM.	Same as the 2001 Chinese GAAP.
Short-term investments valuation	At historical cost or LCM.	At LCM.	At fair market value.
Bad debt allowance	Allowance either based on a government-approved percentage from 0.3%–0.5% or determined by company.	Determined by company.	Same as the 2001 Chinese GAAP.
Construction in process	At amortized cost.	At amortized cost adjusted for impairment	[B] Same as the 2001 Chinese GAAP. [A] At fair market value at the date of revaluation adjusted for depreciation and impairment.
Property, plant, and equipment (PP&E) valuation	At amortized cost.	At amortized cost adjusted for impairment.	[B] Same as the 2001 Chinese GAAP. [A] At fair market value at the date of revaluation adjusted for depreciation and impairment
Intangible assets valuation	At amortized cost.	At amortized cost adjusted for impairment.	[B] Same as the 2001 Chinese GAAP. [A] At fair market value at the date of revaluation adjusted for depreciation and impairment.
Investment property	At amortized cost.	At amortized cost adjusted for impairment.	[B] Same as the 2001 Chinese GAAP. [A] At fair market value at the date of revaluation adjusted for depreciation and impairment.
Pre-operating expense	Deferred as an asset until the entity begins operations, then amortized in no more than five years.	Deferred as an asset until the entity begins operations, then charged to expense at the first month of operation.	Charged to expense when incurred.

^a For certain IFRS, a benchmark measurement is the preferred measurement, however, an alternate treatment is also permitted. [B] Refers to the benchmark treatment and [A] refers to the alternate treatment

understandable and enforceable global accounting standards” (Pacter, 2001, p.67). Studies published prior to 2001 used the term “harmonization” when referring to the comparability and compatibility of accounting standards.⁶ Published research subsequent to 2001 has frequently used the term “convergence” to describe this process. In this study, for consistency and simplicity, we use the term “convergence” to denote both harmonization and convergence.

⁶ A comprehensive review of harmonization studies can be found in Meek and Saudagaran, 1990; Wallace and Gernon, 1991; Gernon and Wallace, 1995; Prather and Rueschhoff, 1996; Saudagaran and Meek, 1997

In 2005, China's regulators stated that the intent of their standard-setting program was convergence with IFRS (IASB, 2005) and, as discussed earlier, each successive stage of the development of Chinese GAAP (1992, 1998, and 2001) has been considered more convergent with IFRS. However, concerns have been raised in prior research over the applicability of IFRS to Chinese accounting practices (Xiang, 1998). Chen et al. (2002) found that convergence under 1998 Chinese GAAP "did not immediately eliminate or significantly reduce the earnings gap [between 1998 Chinese GAAP and IFRS-based net incomes of Chinese listed firms]" (p. 195). Tang (2000) noted "compliance with a set of accounting standards depends not only on the acceptance of the constituency, but also on the competency of the audit profession that makes judgments on how they have been applied... [In China] the independence of the CPA firms is greatly compromised" (p. 98). Concerns have also been expressed over the effect of Chinese preparers' level of competence. Again, as Tang (2000) points out "most accountants working in the industries received education that is not compatible with new approaches. It is more so with the management" (p. 98). These concerns call into question the relevance of China's convergence efforts. In this study we evaluate whether China's efforts to converge 2001 Chinese GAAP with IFRS have resulted in the convergence of Chinese firms' accounting practices with IFRS. To investigate this issue we compare the level of convergence of Chinese listed firms' accounting practices with IFRS in 1999 and 2002. We believe that evidence of improvement in the level of convergence from 1999 to 2002 will provide support for the argument that convergence of accounting standards leads to the convergence of accounting practices.

As mentioned earlier, three methods have been used in prior research to evaluate the convergence of accounting practices. The first method focuses on firms' compliance with accounting standards (compliance). This stream of research is motivated by the concern that converging accounting standards may not lead to converging accounting practices if firms do not comply with the designated standards (Street et al., 1999; Street & Bryant, 2000; Chamisa, 2000; Street & Gray, 1999; Frost & Pownall, 1994; Glaum & Street, 2003; Street & Gray, 2001). Compliance with Chinese GAAP and IFRS is mandatory for Chinese firms that issue both A and B-shares. However, Tay and Parker (1990) remark that "even where compliance with standards is legally required, companies may not comply if it is perceived that the consequences of non-compliance are not serious" (p. 75). Street and Gray (2001) and Xiao (1999) find evidence that Chinese listed firms' compliance with accounting regulations is high. However, neither the Street and Gray nor the Xiao study examine whether a specific firm's compliance with IFRS is the same as its compliance with Chinese GAAP.

The second method used to assess convergence of accounting practices evaluates the consistency of a firm's accounting choices under different sets of accounting regulations (consistency). Research in this area (Van der Tas, 1988; Emenyonu & Gray, 1992, 1996; Archer, Delvaile, & McLeay, 1995; Herrmann & Thomas, 1997) has focused on evaluating the level of convergence in accounting choices for *different* firms *across* countries. Each of these studies used a concentration index to measure convergence and found that the consistency of accounting choices using two sets of accounting regulations was low. None of the studies referenced above evaluated the level of consistency in accounting choices for the *same* firms that prepare annual reports under two sets of accounting standards.

In China, firms that issue both A and B-shares are required to publish Chinese GAAP and IFRS based annual reports. An inconsistency in accounting choices by these firms may

be due to the flexibility provided to firms in the selection of alternative accounting methods. In such situations, using compliance as the sole criterion to evaluate convergence may be misleading. To address this issue, firms' financial reports prepared under two sets of accounting standards should be reviewed to observe whether firms' actual choices for accounting treatments for similar transactions are consistent.

The third method evaluates the significance of any differences in the net income measures produced by the same firm under different sets of accounting standards (comparability) (Gray, 1980; Weetman & Gray, 1991; Cooke, 1993; Norton, 1995; Rueschhoff & Struheck, 1998; Street, Nichols, & Gray, 2000). Most studies in this area use the conservatism index developed by Gray (1980) and renamed the "index of comparability" in Weetman, Jones, Adams, and Gray (1998) to measure the differences in financial reporting numbers produced by the same firm under two sets of accounting standards.

As previously discussed, the CSRC requires Chinese firms that issue both A and B-shares to provide a reconciliation schedule of net income between Chinese GAAP and IFRS. The availability of these reconciliation schedules provides for the relatively straightforward examination of the nature and magnitude of any difference between Chinese GAAP and IFRS. The magnitude of the earnings gap (i.e., the difference between Chinese GAAP-based net income and IFRS-based net income) provides a measure of the degree of convergence.

Chen et al. (1999, 2002) find that a significant difference exists in reported net income between Chinese GAAP and IFRS-based net incomes. These findings are based on a sample of annual reports issued by Chinese listed firms that issued both A- and B-shares from 1994–1997 (Chen et al., 1999) and 1997–1999 (Chen et al., 2002). However, no empirical evidence exists on the status of the earnings difference since issuance of 2001 Chinese GAAP.

In this study, we evaluate the level of convergence of Chinese listed firms' accounting practices in 1999 and 2002 with IFRS using measurement of compliance, consistency, and comparability. We examine: (1) whether Chinese listed firms that issue both A- and B-shares are in substantial compliance with both Chinese GAAP and IFRS; (2) whether these firms use consistent accounting treatments in their Chinese GAAP-based and IFRS-based annual reports; and, (3) whether the net income measurements produced by the same firm in accordance with Chinese GAAP and IFRS are or are not significantly different.

Mandating convergence of a national GAAP to IFRS should provide strong motivation to a country's accounting professionals to gain experience and familiarity with the IFRS model of accounting. Consequently convergence in standards should lead to convergence in practice. Therefore, given China's convergence efforts as evidenced by the promulgation of 2001 Chinese GAAP, we should find: (1) improved compliance with IFRS, (2) improved consistency of accounting choices under Chinese GAAP-based and IFRS-based annual reports, and (3) improved comparability as evidenced by a reduced earnings gap between Chinese and IFRS-based net incomes. Thus, we develop the following three hypotheses:

H1. For Chinese listed firms that issue both A and B-shares, the level of firms' compliance with IFRS significantly improved with the issuance of 2001 Chinese GAAP.

H2. For Chinese listed firms that issue both A and B-shares, the level of consistency of accounting treatments in firms' Chinese GAAP and IFRS-based annual reports significantly improved with the issuance of 2001 Chinese GAAP.

H3. For Chinese listed firms that issue both A and B-shares, the comparability of firms' Chinese GAAP and IFRS-based net incomes significantly improved with the issuance of 2001 Chinese GAAP.

While empirical evidence does not exist for these hypotheses in prior literature, in regard to H3 Chen et al. (2002) find that improved convergence of 1998 Chinese GAAP with IFRS did not result in reduction in the earnings gap between Chinese GAAP and IFRS-based net income. However, it is not known whether the 2001 Chinese GAAP resulted in improved comparability of net incomes, that is, a reduction in the earnings gap between Chinese GAAP and IFRS-based net incomes.

4. Research design

4.1. Research instrument

A checklist instrument (checklist) containing 77 measurement items based on IFRS 1–40 was developed to evaluate the extent of the convergence of Chinese firms' accounting practices with IFRS. This checklist focuses on the major measurement items for annual reports and incorporates all IFRSs issued as of January 1, 2002. Three criteria were used to screen IFRS items. First, the items had to be required to be disclosed in the footnotes of listed firms' annual reports under both IFRS and Chinese GAAP. Second, information relating to firms' choices about a particular accounting treatment had to be commonly available from the accounting policies section of companies' annual reports or from the notes to their financial statements (similar to the methodology used by Emenyonu and Gray, 1992). Third, these items had to be applicable to Chinese listed firms. Items not applicable to Chinese listed firms were excluded from the checklist. For example, measurement requirements for pension accounting and derivatives were excluded because they were not common practices in China in the years we examined. The final checklist was compared to similar instruments used in prior research to ensure that IFRS were correctly addressed.⁷ The final checklist contained 77 items and is presented in Appendix I.

4.2. Sample and data

The 1999 and 2002 annual reports of firms that issue both A and B-shares in China were selected for this study. Complete annual reports of listed firms were not available to the public prior to 1999.⁸ Accordingly, our sample did not include annual reports issued

The following studies were reviewed in developing this instrument: Graham and Wang (1995), Chamisa (2000), Street and Gray (2001), Tang (1994), Nair and Frank (1981), Dougnik (1987), Garrido et al. (2002) and Chen et al. (1999).

Before 1999, the only publicly available information was in the form of a summary of the annual reports published in the CSRC-designated newspapers. Alternatively, annual reports of listed firms could be obtained directly from listed firms. However, even though this is a common practice in western countries, it is not an accepted practice in China. As Xiao (1999) points out, "there is no culture of co-operation between companies and shareholders" and "the law does not require listed companies to distribute financial reports directly even to shareholders" (p. 350).

under 1992 Chinese GAAP. In addition, this limitation necessitated the use of 1999 annual reports for the evaluation of convergence with 1998 Chinese GAAP. Therefore, for consistency in analysis we used the 2002 annual reports to evaluate convergence with 2001 Chinese GAAP. All annual reports were downloaded from the website designated by the CSRC (www.cninfo.com.cn).

The initial sample consisted of 87 firms that issued both A and B-shares as of December 31, 2002. Eight firms were excluded from the initial sample because either these firms' A-shares or B-shares were issued after 1999. The final sample consists of 79 firms (39 listed on the Shenzhen Stock Exchange and 40 listed on the Shanghai Stock Exchange) that have both 1999 and 2002 annual reports available.

4.3. Data analysis

The data for the analysis was collected by identifying the accounting treatment under Chinese GAAP and IFRS for each of the 77 measurement items included in the checklist.⁹ The annual reports were then reviewed to determine if firms' accounting treatments complied with the Chinese GAAP and the IFRS applicable to the given year and if the accounting choices made by each firm were consistent under Chinese GAAP and IFRS.¹⁰ Questions on the applicable accounting treatment that arose in the review process were examined by a second reviewer. The reported net income numbers under Chinese GAAP and IFRS-based annual reports were also collected. Based on this data, the compliance index, consistency index, and index of comparability were calculated for each firm for 1999 and 2002. These indices were used to test the hypotheses applying both univariate and multivariate analyses.

The compliance index is defined as the percentage of specific regulations applicable to a firm with which that firm complied. In order to compute the compliance index, a compliance score is assigned for each measurement item for each firm. A compliance score of one is assigned if a firm reported an item in accordance with the respective standard. Noncompliance receives a score of zero. If the item is not relevant to that company, the item is not included in the calculation. A firm's compliance index is calculated by dividing the sum of its compliance scores by the number of applicable items, as shown in the formula presented below. This index has been widely used in accounting literature to measure the level of compliance with specific accounting regulations (Street et al., 1999; Chamisa, 2000). The compliance index was calculated for both Chinese GAAP and IFRS for 1999 and 2002.

$$\text{A firm's compliance index} = \frac{\text{The sum of compliance scores}}{\text{The number of applicable items}} \quad (1)$$

The consistency index is a measure of the consistency or uniformity in a firm's accounting choices for the same transactions in the financial statements it prepares under

⁹ The complete checklist detailing the comparison of applicable accounting treatments in 1998 and 2001 Chinese GAAP and IFRS is available from the authors upon request.

¹⁰ Chinese GAAP and IFRS effective as of January 1, 1998, were used for firms' 1999 annual reports, while Chinese GAAP and IFRS effective as of January 1, 2001, were used for firms' 2002 annual reports

different sets of accounting standards. A consistency score of “one” is assigned if a firm made the same accounting choice on a specific item in its Chinese GAAP and IFRS-based annual reports. Otherwise a score of “zero” is assigned. If the item was not relevant to that firm, the item was not included in the calculation. A consistency index is then calculated for each firm by dividing the sum of the consistency scores by the number of applicable items, as shown in the following formula. This index ranges from zero to one with one indicating full consistency of a firm’s accounting choices between two sets of accounting regulations.

$$\text{A firm's consistency index} = \frac{\text{The sum of consistency scores}}{\text{The number of applicable items}} \quad (2)$$

The third index measures the comparability between two sets of accounting standards by comparing specific items presented in the financial statements, such as net income and owners’ equity. Unlike the consistency index which only identifies the incidences of accounting treatment differences, the index of comparability quantifies their impact on the financial statement numbers. The formula¹¹ to calculate the index of comparability is:

$$\text{A firm's index of comparability} = 1 - \frac{(\text{IFRS net income} - \text{Chinese GAAP net income})}{|\text{IFRS net income}|} \quad (3)$$

An index value of 1.0 means no difference in reported net income between Chinese GAAP and IFRS. An index value greater than 1.0 means a higher Chinese GAAP net income.

5. Results

5.1. Descriptive statistics

Table 3 presents descriptive statistics for the compliance, consistency, and comparability indices for the 1999 and 2002 annual reports of sample firms. As shown in Table 3, the compliance indices indicate a high level of compliance with Chinese GAAP in both 1999 and 2002. The distributions are asymmetric since a compliance index value of 1.0 is the maximum, as firms cannot exceed full compliance. The mean level of compliance with Chinese GAAP is 0.970 and 0.969 for the 1999 and 2002 annual reports, respectively. However, the mean level of compliance with IFRS is 0.857 and 0.900 for the 1999 and 2002 annual reports, respectively. The compliance with IFRS appears consistently lower than the compliance with Chinese GAAP. For 1999 the minimum is 0.854 for Chinese

¹¹ We also applied the approach used by Chen et al. (2002) to calculate the earnings gap which is different than the index of comparability. Rather than applying a conservatism index, Chen et al. (2002) directly compared the differences between Chinese GAAP and IFRS-based net incomes. Our results, not reported here, are consistent with our findings and our conclusions remain unchanged.

Table 3
Descriptive statistics for the compliance and consistency indices and the indices of comparability

Index	Standard	Year	N	Mean	Std. dev.	Min.	Percentile Values			Max
							25th	50th	75th	
Compliance	GAAP	1999	79	0.970	0.037	0.854	0.946	0.975	1.000	1.000
	GAAP	2002	79	0.969	0.038	0.823	0.953	0.975	1.000	1.000
	IFRS	1999	72 ^a	0.857	0.105	0.414	0.815	0.873	0.934	0.970
	IFRS	2002	67 ^b	0.900	0.070	0.667	0.865	0.919	0.950	0.976
Consistency		1999	72 ^a	0.690	0.080	0.545	0.636	0.673	0.745	0.900
		2002	67 ^b	0.794	0.060	0.657	0.750	0.793	0.839	0.952
Index of Comparability		1999	79	1.883	3.238	0.355	0.994	1.073	1.641	27.490
		2002	79	1.357	2.381	0.047	0.912	1.000	1.098	21.090

Firm's compliance index = Sum of compliance scores for a given firm / Number of items applicable to this firm.

Firm's consistency index = Sum of consistency scores for a given firm / Number of items applicable to this firm.

Index of comparability = $1 - (\text{IFRS net income} - \text{Chinese GAAP net income}) / \text{absolute value of IFRS net income}$.

^a In 1999, seven firms did not provide the IFRS-based annual reports.

^b In 2002, 12 firms did not provide the IFRS-based annual reports.

GAAP and 0.414 for IFRS, and the 25th percentile value is 0.946 for Chinese GAAP and 0.815 for IFRS. Note that the 25th percentile values are relatively close to 1.0 for Chinese GAAP, but notably below 1.0 for IFRS. While we believe these statistics indicate substantial compliance with Chinese GAAP in both years we cannot make the same assertion for IFRS compliance.

The consistency indices indicate a moderate level of consistency in accounting treatments between Chinese GAAP and IFRS-based annual reports in both 1999 and 2002. As indicated for the compliance indices, the distributions for the consistency indices are also asymmetric since a consistency index value can fall short of 1.0, but never exceed it. These indices show that, in 1999, the mean level of consistency between Chinese GAAP and IFRS is 0.690 with a range from 0.545 to 0.900. The median, 50th percentile value, is 0.673. In 2002, the mean level of consistency between Chinese GAAP and IFRS is 0.794 with a range from 0.657 to 0.952. The median is 0.793. This implies that there was an improvement in the consistency of application of accounting methods in the 2002 Chinese and IFRS-based annual reports as compared to the 1999 annual reports[AU1]. Content analysis of the consistency index reveals that differences in standards and non-compliance with IFRS were the primary cause of the observed lack of full consistency.

Index of comparability values exceeding 1.0 indicates that Chinese GAAP net income is higher than IFRS net income. The means and medians of the index of comparability are 1.883 and 1.073 in 1999, and 1.357 and 1.0 in 2002, respectively, indicating that Chinese GAAP net income is higher than IFRS net income in these years. This finding is consistent with the findings of Chen et al. (2002) who find that 1998 Chinese GAAP net income is higher than IFRS net income. Both the mean and the percentile values are more divergent from 1.0 in 1999 than 2002, suggesting a reduction in the earnings gap and the convergence of net incomes as reported in firms' Chinese GAAP and IFRS-based annual reports.

Table 4

Univariate tests of hypotheses 1–3

	Difference in	Period	Mean difference ^a	<i>t</i> -statistic ^b
H1	IFRS compliance	2002 vs. 1999	0.050	4.22***
H2	Consistency index	2002 vs. 1999	0.098	9.45***
H3	Index of comparability	2002 vs. 1999	–0.447 ^a	–3.40***
	GAAP vs. IFRS compliance	1999	0.112	9.52***
		2002	0.064	6.60***

***Statistically significant at the 0.001 level.

^a The mean values for the variables are calculated on a firm-by-firm basis.^b For the index of comparability, the two most extreme observations (corresponding to the maximum values in Table 2) were excluded from the paired *t*-test, but we obtain a similar test statistic ($z = -2.96$, $p = 0.003$) when we include these observations and apply the nonparametric Wilcoxon Signed Rank Test. We also obtain quite similar test statistics when we apply the Wilcoxon Signed Rank Test to the other indices reported in the table.

5.2. Tests of the hypotheses

The tests of the hypotheses evaluate the improvement in the convergence of accounting practices with the issuance of 2001 Chinese GAAP by examining the differences between the 1999 and 2002 IFRS compliance, consistency, and comparability indices. We apply both univariate and multivariate statistical tests to evaluate these hypotheses.

5.2.1. Univariate tests

The results of the univariate tests of the hypotheses are presented in Table 4. As shown therein, paired *t*-tests reveal a significant ($p < 0.001$) increase in IFRS compliance indices from 1999 to 2002, with the mean difference in the index of 0.05. This finding supports H1; the level of firms' compliance with IFRS did significantly improve with the issuance of 2001 Chinese GAAP. The mean difference in consistency indices between 1999 and 2002 was 0.098, representing a statistically significant ($p < 0.001$) improvement in firms' consistent application of accounting treatments under Chinese GAAP and IFRS. This finding supports H2, the level of consistency of accounting treatments in firms' Chinese and IFRS-based annual reports significantly improved with the issuance of 2001 Chinese GAAP.

Finally, results in Table 4 show a significant reduction in the index of comparability values from 1999 to 2002, supporting the conclusion of a smaller earnings gap between Chinese GAAP and IFRS-based annual reports. This finding supports H3, the difference between firms' Chinese GAAP and IFRS-based net incomes significantly improved with the issuance of 2001 Chinese GAAP.

Table 4 also shows that in 1999 the Chinese GAAP compliance index is, on average, 11.2 percentage points higher than the IFRS compliance index; the mean difference fell to 6.4 percentage points in 2002, which are statistically significant at the 0.001 level. Hence, within firms, the level of compliance with IFRS is significantly lower than the level of compliance with Chinese GAAP in both years.

This finding of higher Chinese GAAP compliance may reflect the learning involved in the convergence process—that is, Chinese listed firms are most familiar with Chinese GAAP and

Table 5
Descriptive statistics for independent variables in Eq. (4)

Variable ^a	1999		2002		Δ 1999 to 2002		
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	t-statistic
%State ownership	31.164	24.624	35.262	23.507	1.700	11.299	1.16
%Inst. ownership	3.070	2.711	1.920	2.514	-1.200	2.236	-4.12
MNC	0.097	0.298	0.121	0.329	0.017	0.130	1.00
Sales	1.226	1.711	1.917	2.299	0.632	1.328	3.66
ln(Sales)	-0.511	1.393	-0.088	1.432	0.365	0.977	2.87
%ROE	1.538	51.791	4.837	34.189	4.278	65.194	0.50
%Intangible assets	0.958	1.998	3.300	5.554	2.235	5.082	3.38
Big 4 auditor B-shares	0.597	0.494	0.318	0.469	-0.254	0.512	-3.81
Big 4 auditor A- & B-shares	0.250	0.436	0.303	0.463	0.085	0.337	1.94
Number of observations	72		66		59		

^a %State Ownership, and %Inst. Ownership, indicates the percentage of state and institutional ownership, respectively, in firm *i*;

MNC_{*i*} — an indicator variable equal to one for multinational corporations;

Sales_{*i*} — the level of sales, in billions of dollars;

%ROE_{*i*} — the return on equity ratio calculated as the net income in a given year divided by end-of-year owners' equity;

%Intangible Assets_{*i*} — the percentage of end-of-year intangible assets to end-of-year total assets;

Big 4 Auditor B- Shares_{*i*} — an indicator variable equal to one if the firm used a Big 4 auditor for the B-share annual report only;

Big 4 Auditor A- & B- Shares_{*i*} — an indicator variable equal to one for firms that used a Big 4 auditor for both A- and B-share annual reports.

^a Sales, %ROE, and %Intangible assets defined based on B-share annual reports.

as a result it is easier for them to comply with Chinese GAAP than to comply with IFRS. The improvement in the mean difference between Chinese GAAP and IFRS compliance from 1999 to 2002 also indicates that firms' practices are more convergent in 2002 as compared to 1999 providing further support for our hypotheses.¹²

5.2.2. Multivariate tests

A question arises as to whether the univariate test results are due to convergence or to firm characteristics such as firm size, profitability, Big 4 auditing status, percentage of intangible assets, status as a multinational corporation, and level of state and institutional ownership.

¹² The finding of higher Chinese GAAP compliance as compared to IFRS compliance was unexpected since Chinese B-share financial reports are required to be audited by an international accounting firm, whereas A-share financial reports may be audited by local accounting firms. We conduct additional analysis to determine if there is a difference in compliance for companies that have a Big 4 accounting firm audit their B-share financial reports versus a non-Big 4 international accounting firm. We find that the mean IFRS compliance index is higher, albeit still lower than Chinese GAAP compliance, for firms that have a Big 4 accounting firm audit their B-share financial reports. In 1999 mean IFRS compliance was 86.4% for Big 4 audited firms versus 81.9% for other firms; similarly, in 2002 mean IFRS compliance was 91.0% for Big 4 audited firms versus 88.4% for other firms.

Larger and more profitable companies may have the financial resources to invest in a reporting system that meets the requirements of both IFRS and Chinese GAAP. Companies that engage a Big 4 firm to audit both their A and B-share financial reports may have more consistency in interpretation of accounting treatments as well as a greater understanding of the requirements of IFRS. The IFRS rules relative to intangible assets are more complex than Chinese GAAP. Thus, compliance with IFRS may be more difficult to achieve in this area and will negatively affect the IFRS compliance for companies with substantial intangible assets. Finally, the corporate-governance structure (level of state ownership or institutional ownership and/or status as a multinational corporation) may in turn result in different priorities which may in turn result in different levels of compliance with Chinese GAAP and IFRS. Thus, changes in these firm characteristics may account for the observed improvement in IFRS compliance, consistency, and comparability of annual reports. Descriptive statistics for the independent variables are presented in Table 5. We defined the variables, sales, return on equity, and intangible assets using values from B-share annual reports. We chose this definition since we used IFRS as the denominator in the construction of the index of comparability and since our focus is to measure the impact of the convergence of Chinese GAAP with IFRS. We note, however, that our results are essentially similar if we use values from A-share annual reports.

For completeness, in Table 5 we report the mean and standard deviation for the levels of the variables in 1999 and 2002 as well as mean and standard deviation for the firm-by-firm difference in the variables from 1999 to 2002. In the last column of Table 5, we also present paired *t*-statistics for the firm-by-firm differences, which indicate statistically significant

Table 6
Results of the multivariate tests of hypotheses 1–3

	Δ IFRS compliance index ^a	Δ Consistency index ^a	Δ Comparability index ^a
Δ State ownership	0.002 (1.559)	0.001 (0.601)	-0.001 (-0.064)
Δ Inst. ownership	-0.003 (-0.574)	0.002 (0.449)	0.014 (0.173)
Δ MV	0.055 (0.582)	0.007 (0.084)	0.687 (0.505)
Δ Sales	0.012 (1.009)	-0.010 (-0.995)	0.130 (0.742)
Δ ROE	$5.6E-5$ (-0.288)	$3.6E-4$ (2.185)*	2.7E-4 (0.095)
Δ Intangible assets	0.004 (1.643)	-0.002 (-1.127)	-0.011 (-0.317)
Δ Big 4 auditor B-shares	0.035 (1.169)	-0.027 (-1.061)	0.227 (0.516)
Δ Big 4 auditor A & B-shares	-0.051 (-1.148)	0.040 (1.063)	0.055 (0.082)
	0.045 (2.854)**	0.093 (6.820)***	-0.335 (-1.435)
R-squared	0.20	0.16	0.02
F statistic	1.56	1.21	0.14
Observations	59	59	58

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^a *t*-statistics are reported (in parentheses) below coefficient estimates.

changes in the variables, percent institutional ownership, sales (and natural log of sales), percentage intangible assets, and the variable indicating a Big 4 auditor for B-shares.

In Table 6, we present the results of the multivariate tests of hypotheses. The dependent variables in our multivariate tests are the same as those in Table 4: the change in IFRS compliance, consistency, and comparability indices between 1999 and 2002. Because the dependent variables measure the change in the respective indices from 1999 to 2002, the regressors in this equation reflect the change in values from 1999 to 2002 as captured by the following regression model:

$$\begin{aligned} \Delta \text{Index}_i = & \beta_0 + \beta_1 \Delta \% \text{State Ownership}_i + \beta_2 \Delta \% \text{Inst. Ownership}_i + \beta_3 \Delta \text{MNC}_i \\ & + \beta_4 \Delta \ln(\text{Sales}_i) + \beta_5 \Delta \% \text{ROE}_i + \beta_6 \Delta \% \text{Intangible Assets}_i \\ & + \beta_7 \Delta \text{Big 4 Auditor B Shares}_i + \beta_8 \Delta \text{Big 4 Auditor A- \& B-Shares}_i \\ & + \Delta e_i \end{aligned} \quad (4)$$

where i is an individual firm; $\% \text{State Ownership}_i$ and $\% \text{Inst. Ownership}_i$ indicate the percentage of state and institutional ownership,¹³ respectively; MNC_i is an indicator variable equal to one for multinational corporations; Sales_i , as a proxy for size, is the natural log of sales; $\% \text{ROE}_i$, as a proxy for profitability, is the return on equity ratio calculated as the net income in a given year divided by end-of-year owners' equity; $\% \text{Intangible Assets}_i$ is the percentage of end-of-year intangible assets to end-of-year total assets; $\text{Big 4 Auditor B-Shares}_i$ is an indicator variable equal to one if the firm used a Big 4 auditor for the B-share annual report only; $\text{Big 4 Auditor A- \& B-Shares}_i$ is an indicator variable equal to one for firms that used a Big 4 auditor for both A- and B-share annual reports;¹⁴ and e_i is the error term.¹⁵ We estimate a separate regression for each of the dependent variables reflecting change in IFRS compliance and change in the consistency and comparability indices.

Estimation results for Eq. (4), our multivariate tests of Hypotheses 1–3, are presented in Table 6. Eq. (4) is structured such that the estimates of the constants are directly comparable to the mean differences reported in Table 4. That is, the unconditional estimates of the change (mean differences) in the respective indices from 1999 to 2002 reported in Table 4 are comparable to the constants reported in Table 6 which estimate the identical change after controlling for changes in firm size, profitability, and other firm characteristics. We find that the estimates in Table 6 are remarkably close to the unconditional estimates (mean differences) in Table 4; for example, compare the increase of 0.045 in the IFRS compliance index (the constant) in Table 6 to the mean difference of 0.050 in Table 4. Similarly, the two estimates for the change in the consistency index differ by only 0.005. Hence, the multivariate tests provide support for H1 and H2, confirming the inferences drawn from Table 4 concerning these hypotheses. For the index of comparability, the confirmation is somewhat weaker. Though the

¹³ Because information on the number of institutional shareholders was unavailable in China until after 2002, we used a proxy for percent institutional ownership, the percentage of institutional shareholders within the top 10 share-holders relative to total shares. Unlike in western countries, the percentage of institutional investors has not been significant for Chinese listed firms.

¹⁴ All of the firms in the sample that use a Big 4 auditor for A-shares also use a Big 4 auditor for their B-share audits during the period under review.

¹⁵ A variable representing management ownership of shares in China is not included since insider shareholding is extremely limited in China, less than one-tenth of 1% (Firth, Fung, & Rui, 2007).

estimate of the constant in Table 6, -0.335 , is similar to the mean difference in Table 4, -0.447 , the estimate of the constant is not statistically significant at conventional levels.

The summary statistics for the regressions reported at the bottom of Table 6 also support the idea that these conditional estimates of the change in compliance indices are consistent with the unconditional estimates (mean differences) of the change in index values reported in Table 4. Note, for example, that the F -statistics are all relatively small so that for each of the three regressions we would have little evidence inconsistent with the null hypothesis that the slope parameters for Eq. (4) all equal zero ($H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$). That is, the restrictions in this null hypothesis imply the parsimonious model $\Delta \text{Index}_i = \beta_0 + \Delta \epsilon_i$, which is the model estimated in the univariate tests presented in Table 4.

Given the findings of higher compliance with Chinese GAAP compliance than IFRS compliance we examine the estimates of the Big 4 auditor indicator variables in the regression model for the change in the consistency index. Note that the estimate of the parameter for the variable *Big 4 Auditor B-Shares*, β_7 , is -0.027 and the estimate of the parameter for the variable *Big 4 Auditor A- & B-Shares*, β_8 , is 0.040 . This is consistent with intuition that having a Big 4 auditor for B-shares and a non-Big 4 auditor for A-shares results in lower consistency, but having, presumably, the same Big 4 auditor for both A- and B-shares results in an increase in consistency.

6. Conclusion

In this study we examine whether China's efforts over the last 15 years to converge domestic standards with IFRS have been successful in the convergence of Chinese listed firms' accounting practices with IFRS. We use three evaluation methods: the compliance index, the consistency index, and the index of comparability to assess the level of convergence of accounting practices. Our analysis is based on the 1999 and 2002 annual reports of listed firms that are required to follow both Chinese GAAP and IFRS (A- and B-share issuers).

We find significant ($p < 0.001$) improvement in IFRS compliance from 1999 to 2002. While this finding supports H1, interestingly we do not find the same level of compliance with IFRS in either year. Mean IFRS compliance indices were 0.857 and 0.900 for the 1999 and 2002 annual reports, respectively, while mean Chinese GAAP compliance indices were 0.970 and 0.969 , in 1999 and 2002, respectively. Consistent with this observation we also found that firms' compliance with Chinese GAAP is significantly higher ($p < 0.001$) than their compliance with IFRS in both 1999 and 2002.

Evaluation and testing of the consistency indices reveal a significant improvement ($p < 0.001$), in 2002 as compared to 1999, in the consistency of accounting treatments between Chinese GAAP and IFRS-based annual reports. However, full consistency has not been achieved.

Analysis of the index of comparability reveals an earnings gap between the net income numbers reported in Chinese and IFRS-based annual reports in 1999. This study extends the study by Chen et al. (2002). We extended Chen et al. (2002) and evaluate the effect of convergence of Chinese GAAP with IFRS with the issuance of 2001 Chinese GAAP and find a significant ($p < 0.001$) reduction in the earnings gap between firms' Chinese and IFRS-based net incomes in 2002 relative to 1999 annual reports.

Overall, we believe that the significant improvements we observe in the compliance, consistency, and comparability indices from 1999 to 2002 provide evidence that the convergence of Chinese GAAP with IFRS result in firms' accounting practices converging with IFRS.

Certain limitations should be considered. One limitation is the subjectivity inherent in the selection of the accounting measurement treatments included in the measurement instrument, as well as during the data collection process. Another limitation of the study is the small sample size. Only 79 firms are investigated. Although they represent all firms that issue both A- and B-shares, generalization of results to firms that issue A-shares only may not be possible. Finally, this study is subject to the limitation of certain firms' nondisclosures. Notwithstanding these limitations, the findings of this study contribute to the convergence literature and may be of interest to regulators in emerging capital markets.

Appendix I. Research instrument

IAS2: Inventories

- 1 Determination of cost of goods sold (CGS)
- 2 Determination of ending inventory cost
- 3 Recognition of inventory impairment and reversal of impairment
- 4 Determination of CGS of low value inventories

IAS 8: Accounting policies, changes in accounting estimates, and errors

- 5 Non-mandated changes in accounting policy
- 6 Mandatory changes in accounting policy
- 7 Change in accounting estimates
- 8 Prior period fundamental errors

IAS 10: Events after the balance sheet date

- 9 Adjusting event and non-adjusting event
- 10 Sales return and sales cut-off
- 11 Dividends declared

IAS11: Construction contracts

- 12 Contract revenue
- 13 Expected loss on a construction contract
- 14 Borrowing costs incurred for construction contracts

IAS12: Income taxes

- 15 Recognition of tax expense or income
- 16 Treatment for deductible temporary differences
- 17 Treatment for timing difference when there are changes in tax rates or imposition of new taxes

IAS16: Property, plant and equipment (PP&E)

- 18 Determination of depreciation method, estimated useful life, and residual value of PP&E
- 19 PP&E and construction in process (CIP) on balance sheet date
- 20 Recognition of impairment of PP&E and CIP
- 21 Accounting for reversal of impairment
- 22 PP&E received as a capital contribution
- 23 Exchange of dissimilar PP&E
- 24 Exchange of similar PP&E

IAS17 Leases

- 25 Operating lease incomes/payments
 - 26 Depreciation method for a leased asset
 - 27 Lessee measurement of assets and related liability acquired from a finance lease
 - 28 Discount rate used to measure the PV of MLP in a finance lease
-

(continued on next page)

Appendix I (continued)

- 29 Amortization of unrecognized finance charge of a finance lease by lessee
- 30 Initial direct costs of a finance lease by lessee
- 31 Initial direct costs of a finance lease by lesser
- 32 Lessor measurement of a finance lease
- 33 Lessor measurement of income from a finance lease
- IAS20 Accounting for government grants and disclosure of government assistance
 - 34 Government grant received to fund a specific project
- IAS21: The effects of changes in foreign exchange rates
 - 35 Initial recognition of foreign currency transaction
 - 36 Monetary items reported on balance sheet date
 - 37 Exchange differences in the normal operation
 - 38 Nonmonetary items reported on balance sheet date
 - 39 Method of translating financial statement of foreign operations
 - 40 Treatment of translation difference
- IAS22: Business combinations
 - 41 Recognition of goodwill
 - 42 Measurement of goodwill
 - 43 Amortization of goodwill
 - 44 Amortization of negative goodwill
 - 45 Measurement of minority interest
- IAS23: Borrowing costs
 - 46 Accounting for borrowing costs
- IAS27: Consolidated and separate financial statements
- IAS28: Investments in associates.
- IAS31: Interests in joint ventures
 - 47 Consolidation
 - 48 Accounting for investments in subsidiaries and associates
 - 49 Recognition for impairment of subsidiaries and associates
 - 50 Investor has joint control
 - 51 Gain on disposal of a subsidiary as a result of issuance of additional shares by the subsidiary to third parties
- IAS37: Provisions, contingent liabilities and contingent assets
 - 52 Measurement of provisions
 - 53 Measurement of contingent assets and liabilities
- IAS38: Intangible Assets
 - 54 Amortization of intangible assets
 - 55 Intangible assets on balance sheet date
 - 56 Recognition of impairment
 - 57 Accounting for reversal of impairment
 - 58 Pre-operating expenses
 - 59 Research and development (R&D) costs
 - 60 Intangible asset received as a capital contribution
 - 61 Intangible asset received in a non-monetary transaction
 - 62 Land use rights
- IAS39: Financial instruments: Recognition and measurement*
 - 63 Criteria for the determination of bad debt allowance
 - 64 Carrying value of accounts receivable on balance sheet date
 - 65 Short-term investments on balance sheet date
 - 66 Dividends received on short-term investments
 - 67 Long-term investments in equity securities on balance sheet date
 - 68 Long-term investments in debt securities on balance sheet date
 - 69 Amortization of premium or discount on long-term debt investments
 - 70 Carrying value of financial instruments

Appendix I (continued)

- 71 Investment securities received as a capital contribution from owner
- 72 Investment securities received in a non-monetary transaction
- 73 Recognition of impairment of financial instruments
- 74 Accounting for reversal of impairment of financial instruments
- 75 Debt restructuring
- IAS40: Investment property*
- 76 Measurement on balance sheet date
- Other
- 77 Initial recognition of an asset**

* IFRS that were adopted in 2002 but not adopted in 1999.

** Item 77 is a measurement item applicable to IAS 2, 16, 17, 38, and 39. It is listed separately to avoid inappropriate weighting.

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Book Review Section

The book review section is interested in works published in any language, as long as they are comparative or international in character. The author or publisher of such works should furnish the book review editor with two (2) copies of the work, including information about its price and the address where readers may write for copies. Reviews will be assigned by the book review editor. No unsolicited reviews will be accepted. Suggestions of works that might be reviewed are welcomed.

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Book reviews

Extraordinary circumstances: The journey of a corporate whistleblower, Cynthia Cooper, 2008, Wiley, Hoboken, NJ, xiii + 402 pages, \$27.95, €18.86, ISBN 978-0-470-12429-1

Extraordinary Circumstances is Cynthia Cooper's tale of her journey to become a whistleblower in the infamous WorldCom case. Written in response to the well-documented financial scandals at WorldCom and other companies, the reception of this book will vary greatly among the reading audience. Its content provides a chronological understanding of events that led to the biggest corporate bankruptcy in U.S. history—a scandal that made society aware of the importance of “doing the right thing” and not being pressured into compromising ethical values and professional responsibility. Cynthia Cooper was vice-president of internal audit at WorldCom when she decided to investigate anomalies in the company's financial reporting, thus challenging CEO Bernie Ebbers and CFO Scott Sullivan, two powerful executives who were subsequently brought to justice. The WorldCom failure in the telecom industry, just as the recent failures in the housing industry which caused the subprime mortgage crisis, teaches that history will repeat itself as long as policy makers, regulators, standard setters, and corporate gatekeepers continue their reactive rather than proactive approach to corporate wrongdoings.

This book presents a brilliant overview of the whistleblower process by describing both personal and business lessons. Chapter 1 provides insight into the working relationships between Ms. Cooper and some of the senior executives at WorldCom and a description of fraud schemes at the company. A compelling overview of the accounting scandal is provided, detailing how otherwise honest people slowly fall prey to the corporate machine and almighty dollar. Chapters 2–6 cover Ms. Cooper's background while chapters 7–13 follow her career from the time she returned to Mississippi, eventually becoming head of the internal audit department at LDDS (future WorldCom). These chapters provide a first-hand look at the company environment at this time, as well as Ms. Cooper's challenges in running the internal audit department. Chapters 14–17 describe the good times at WorldCom, including its acquisition of MCI, and examine Mr. Ebbers' views about his personal finances. Chapters 18–23 describe the downturn of WorldCom, along with internal audit's role in investigating accounting anomalies and the eventual discovery of the accounting fraud. The most riveting part of the book comes in chapters 20–23, starting with the exit of CEO Bernard Ebbers, during which time the whole scandal really unfolds. Chapters 24–29 describe the fallout resulting from the fraud, including the impact on the company, its employees, shareholders, regulators, and other parties involved. The book closes with an epilogue, in which Ms. Cooper discusses values and decisions, including the

ethical choices and pressures that all individuals face on a daily basis. She provides readers with tools to assess ethical dilemmas and make the right decisions in the form of ten steps to "sort through tough issues and make the right choices" (p. 365), which should prove very beneficial to existing and future business leaders.

One of the book's strengths is the thorough discussion of the corporate identity and reality (rise and fall of WorldCom) and real-life whistleblower examples that are effectively interwoven throughout the book. Another key highlight is that the book captures the reader's attention almost immediately regarding "how power and money can change people, and how easy it is to rationalize, give in to fear, and cave under pressure and intimidation from superiors" (back cover). After reading the first few pages of this compelling book, readers are motivated to set aside other tasks and continue to read the entire book. The author effectively integrates a variety of seemingly unrelated issues and facts regarding the extraordinary circumstances of WorldCom. This book, as stated by the author, is about "human nature, about people and choices" (p. 362), and, eventually, making the ethical decision to pursue corporate malfeasance, and to bring wrongdoers to justice. Step-by-step this book takes readers a step through the gamesmanship process of engaging in fraudulent financial activities at WorldCom by addressing incentives to participate in fraud, opportunities that make fraud possible, rationalization for justifying fraud, willingness of employees to participate in fraud, and the courage of whistleblowers to come forward and testify in a federal criminal trial. Cooper writes a compelling present-tense narrative that would actually make a good work of fiction, and the numerous short chapters make for easy reading. One of the biggest advantages of this storytelling style is that the action keeps moving, and one does not have to have prior knowledge of accounting or corporate scandals to both learn some history and enjoy a good book. However, the numerous details of Cooper's personal life, especially prior to her time at WorldCom, get in the way of this reviewer's desire to focus on WorldCom's scandal, particularly its audit failures.

A limitation of the book is the lack of adequate discussion of red flags (excessive growth, unnecessary complexity, high leverage) that signaled the eventual WorldCom collapse even before the discovery of fraud. This book would benefit from a thorough analysis of the determinants of WorldCom's demise, including the unnecessary business and financial reporting complexity, the excessive risk-taking attitudes and appetites of its corporate directors and officers, the ineffective risk assessment of complex business transactions (mergers and acquisitions) in the telecom industry, the dot-com bubble and collapse of the telecom industry, and the inefficiency of regulations to protect investors. Finally, since the book is written in the post-Sarbanes-Oxley (SOX) era, it would have significantly benefited from including some SOX provisions and corporate-governance measures designed to prevent and detect further occurrences of fraud.

Extraordinary Circumstances presents relevant information and useful guidance for identifying conflicting incentives, opportunities, and rationalizations that can result in fraud. The book is, by and large, well written and comprehensive in its coverage of events leading to the bankruptcy of WorldCom. It is user-friendly, easy to read, and a page-turner, even for those with little financial background. This book is low in cost (just under \$28), is easier to understand than the typical professional books on financial reporting, and could be used as a supplement in corporate governance, ethics, and forensic accounting courses. It is

an excellent desk reference for those serving on corporate boards and non accountants who somehow engaged in the financial-reporting process. Corporate directors, particularly audit-committee members responsible for establishing whistleblower policies and internal auditors responsible for implementing such procedures, should find this book to be an invaluable resource. Lessons learned from this book are that recent corporate-governance measures and best practices designed to improve financial-reporting quality, including more effective communication and relationships between internal and external auditors and the audit committee, are steps in the right direction to curtail future financial scandals. After reading this book, external auditors will be more skeptical about their audit procedures and be more willing to gather evidence about financial-statement fraud, irregularities, extraordinary circumstances, and illegal acts by their clients. Readers will learn to be skeptical of assuming that fraud will not occur in their organizations, especially when common sense leads them to irregularities and anomalies in their organization's business and reporting activities. This book will help give potential whistleblowers the courage to come forward and report questionable activities. Readers from all audiences could enjoy this book but should be forewarned not to expect a detailed recitation of WorldCom's journey to indictment and bankruptcy. Instead they will get a more personal, revealing perspective of the challenges of ethical decision-making in the competitive corporate environment.

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Business analysis and valuation — IFRS edition, Business analysis and valuation — IFRS edition, Krishna G. Palepu, Paul M. Healy, Victor L. Bernard, Erik Peek, Thomson, London (2007), xvi + 788 pages, US\$ 67.99, £35.99, €48.30, ISBN: 978-1-84480-492-4

This book is a European version of *Business Analysis and Valuation Using Financial Statements* by the first three of the four authors mentioned above. The latter could be called the American version insofar as it focuses on the use of U.S. GAAP in the preparation of financial statements and all the cases in it are of American companies.

The American version made a deep impact in the teaching of Financial Statement Analysis and Firm Valuation by providing an integrative framework for analysis and use of financial statements.

The IFRS edition is an appropriate and logical extension of the American version. IFRS refers to the International Financial Reporting Standards issued by the International Accounting Standards Board. Starting in 2005 listed European Union companies are required to publish financial statements in accordance with the IFRS. In order to be approved for use in the EU, standards must be endorsed by the Accounting Regulatory Committee (ARC), which includes representatives of member state governments and is

advised by a group of accounting experts known as the European Financial Reporting Advisory Group (EFRAG). Erik Peek of the Maastricht University in The Netherlands has done an admirable job of adapting the book to the European context.

The preface to the IFRS edition states:

1. European business has its own unique character.
2. In addition, the recent requirement that public corporations in the European Union prepare their Financial statements in accordance with IFRS has changed the European reporting environment substantially.

These two factors are the justification underlying the IFRS edition.

The IFRS edition is largely similar in its structure to the American version. It has the same 13 chapters and follows the same framework for analysis and valuation proposed in the American version. Starting with Strategy Analysis the book moves through Accounting Analysis and Financial Analysis to Prospective Analysis which then formed the basis of firm valuation. Chapters 3 and 4 deal with Accounting Analysis. These chapters comprehensively list the possible categories of "accounting cosmetics," offer methods to adjust for these cosmetics and derive "clean" numbers. Chapters 6, 7, and 8 are devoted to forecasting the accounting numbers and their appropriate use in firm valuation. Chapter 7 of the book reconciles the Discounted Dividends and Discounted Abnormal Earnings model thereby providing a sound conceptual basis for using Accounting Numbers in firm valuation. Chapters 9 to 13 deal with different situations in which the valuation approaches rolled out in the earlier chapters are applied to a variety of decisions such as valuation in IPOs, credit analysis, valuations in the context of Mergers and Acquisitions, and signaling through financing decisions, communication, and governance. Each chapter has at the end a case for analysis that illustrates the application of the concepts. In addition, the book has 12 other cases at the end, making it a self contained text for a graduate level course.

The IFRS version makes two significant contributions. First, it replaces all US GAAP related discussions with discussions of the corresponding IFRS. This significantly alters the contents of chapters 3 and 4 dealing with Accounting Analysis. The IFRS related content runs through the book. A second significant contribution is the inclusion of a large number of cases of European companies in the book.

The American version featured 13 cases, each one at the end of a chapter. Some of these such as the CUC International and Harnischfeger have gone on to become classics and have been published in leading journals in the field. In addition, the American version features another 15 cases at the end of the text. The IFRS version has retained only three of the 13 end-of-chapter cases from the American version. Ten end of the new chapter cases are about European companies. Seven of these ten have been authored by Prof. Peek. The industries covered in these cases are diverse including automobile, airlines, real estate, and oil and gas. Particularly interesting is the case of PartyGaming Plc's, an online gaming supplier's, IPO. Land Securities Group and Fiat Group's first-time adoption of IFRS deal with complex issues in transitioning from one set of standards to another.

The IFRS version has only 12 cases at the end of the text. Of these eight are cases that appeared as end of chapter cases in the American version. Perhaps future IFRS editions will make further additions of European cases to the end of the chapter list of cases.

European cases have the effect of bringing the text closer to the European audience. European students, in my experience, bring a lot of supplemental information into the analysis of these cases, motivated both by an interest in what is happening in their backyard and by the ease of access they have to analysts and managers in Europe who support with information.

In addition to the cases, the IFRS version uses examples of European companies in all chapters. As examples, in chapter 4 Recasting of Financial Statements into Standardized Formats uses Volkswagen's financial statements (p. 226); in chapter 5 Historical values of Key Financial Ratios is of non-financial companies listed in one of the seven major European companies; in Chapter 6, example of forecasting uses data from Porsche and so on. This is Europeanization of the book in every detail. It will certainly increase participant involvement in the use of the book in Europe.

Student and Instructor support for the book is available at http://www.cengage.co.uk/palepu_peek/inst_title_open.htm. Support includes spreadsheets to support case analysis, excel formats for standardizing financial statements, select web-links that could potentially help students write the epilogue to the cases, and a corrigendum sheet. All too often, financial-analysis text books fail to provide good support material, thus requiring users to spend their time collecting data rather than applying their efforts to the real task of analysis. This book is an exception.

Overall, a very good book has been made better for the European audience.

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Accounting and the Global Economy After Sarbanes-Oxley, Don E. Garner, David L. McKee, and Yosra AbuAmara McKee, M.E. Sharpe, Inc., Armonk, NY (2008), xii + 259 pages, US\$68.95, €49.30, ISBN: 978-0-7656-1376-9

The authors of this book examine a variety of challenges that face the practice of accounting and auditing within the context of a rapidly changing business environment. Part one provides a general frame of reference for this discussion and includes four chapters. Part two identifies specific issues facing accounting and auditing practice, including harmonization of auditing standards (chapter 5), the growing problem of independence (chapter 6), adjustments required by the global financial system (chapter 7), and the impact of technology (chapter 8). Part three includes two chapters that focus on firm effectiveness and practical issues that accounting and auditing firms must consider in the new global environment. The content and tone of this book seems best suited to an academic environment. Specifically, the book would be a useful supplement to most auditing textbooks, either at the graduate or undergraduate level.

Chapter 1 provides an important historical summary of the growth of the large accounting firms, especially the change in perspective as these firms began to focus more on consulting services and less on their responsibilities to the public trust. The result, as is well known in the accounting profession, is the demise of a number of publicly-traded

firms, and ultimately the loss of self-regulation by the profession with enactment of the Sarbanes-Oxley Act of 2002 (SOX). The remainder of the book analyzes the effect of SOX on corporate financial reporting.

Chapter 2 presents issues and concerns associated with the efforts of regulators and standard setters to move accounting standards toward comparability. The authors begin this discussion with the International Accounting Standards Committee (IASC) that was formed in 1973. The early IAS were problematic because too many alternative treatments were allowed, thus producing financial statements that could not be reliably compared. As a result, these efforts at harmonization gave way to a focus on convergence of the various national standards with International Financial Reporting Standards (IFRS). For this to occur, adjustments will be required regarding (1) information needs of users, (2) the size of business entities, and (3) whether these standards should be rule based or principle based.

After a brief discussion of the international standard-setting organizations for auditing, Chapter 3 identifies and describes recommendations from the 2003 report of the Task Force on Rebuilding Public Confidence in Financial Reporting. Members of this task force included individuals from Australia, Canada, France, Japan, the United Kingdom, and the United States. Many of the recommendations made in this report are also included in the Sarbanes-Oxley Act. For example, the audit committee of the board of directors should (1) be directly involved with the internal audit function as well as with the external auditors, (2) be responsible for monitoring the integrity of financial reporting, and (3) be financially literate.

Chapter 4 analyzes the major provisions contained in the Sarbanes-Oxley Act. Rather than simply listing the information according to its section number in the Act, the authors examine the provisions according to major problem areas, which is easier for the reader to follow and understand. These areas include: financial accounting standard setting, boards of directors, management, internal controls, PCAOB, auditor independence, and other important parties involved in the financial reporting process. The authors also describe some of the costs and benefits public companies have experienced in complying with the provisions of SOX. Further, the authors report some of the auditing reforms undertaken in the United Kingdom, France, and Japan. The chapter concludes with a brief discussion of improvements attempted by international organizations, noting that the auditing standards issued by the PCAOB present some obstacles to convergence.

In Part 2 of the book, the authors elaborate on four issues they believe are important to accounting firms and the accounting profession. Chapter 5 deals with the first issue, which focuses on the obstacles that may impede progress towards harmonization of auditing standards. Although more than 70 countries have adopted the auditing standards promulgated by the International Auditing and Assurance Standards Board (IAASB), the United States has not adopted the IAASB standards. The major concern on the part of the United States is that U.S. auditing standards are proscriptive, with detailed, specific requirements, whereas the international standards use a principles, threats, and safeguards approach. The authors identify a number of other concerns that must be resolved regarding international auditing standards.

The second issue facing accounting firms and the accounting profession is independence from the client (Chapter 6). The authors provide a brief history of independence violations by the accounting firms that caused the SEC to initiate investigations, and ultimately revise independence rules based on specific requirements of the Sarbanes-Oxley Act. The authors

also include an interesting summary of the European Union (EU) code for auditor independence, including such topics as accountant family and personal relationships, client and employee shifts, and auditor rotation. This chapter could be the basis for a student assignment that compares independence standards in the EU and the United States.

Chapter 7 offers a colorful description of the history of the Big Eight firms, their mergers, the demise of Andersen, and the resulting Big Four international accounting firms. The authors include important insights regarding the impact of having only four large international firms, even as the global marketplace becomes larger and more complex. To adjust and accommodate the increased demands for services post-SOX, the Big Four firms are forming alliances with second-tier firms, and midsize firms are consolidating.

The fourth issue is the impact of the Internet and other technologies on accounting firms and the accounting profession (Chapter 8). The authors first discuss several studies that suggest the enormous potential the Internet represents for business productivity, and then a number of additional studies that document the use of the Internet, audit software, intranets, and other technologies used by accountants. The chapter concludes with an informative primer on Extensible Business Reporting Language (XBRL) and the potential that this technology represents in terms of efficiency and productivity gains.

The final two chapters of the book are included in part three, which focuses on the improved effectiveness of accounting firms as a result of compliance with the Sarbanes-Oxley Act (Chapter 9) and the adeptness of accounting firms to adapt to the constantly changing global business environment (Chapter 10). In Chapter 9, the authors identify a number of studies that indicate public companies and accounting firms should be more effective in the future. Specifically, studies report improved corporate governance, board members who are more qualified and capable, identification and remediation of internal control weaknesses, and voluntary adoption of some SOX provisions by non-public organizations and smaller firms. Public accounting firms are (1) more carefully examining who they accept as clients, (2) increasing the number of female partners, (3) moving towards electronic storage of documents, and, as discussed in an earlier chapter, (4) forming partnerships and alliances with other accounting firms. Chapter 10 concludes the book with a discussion of various issues that still demand the attention of professional accounting firms, such as financial-statement restatements, auditor liability and litigation costs, and peer reviews to increase transparency.

In my view, the book has a number of strengths as a supplemental text for an auditing course. First, each chapter contains a brief history of the particular topic, which gives the reader a framework to analyze and assess the new information that is also included. Second, the narrative is well organized and the material is easy to understand. Third, the information is presented in an interesting and compelling format so that students can enjoy the learning process. Finally, the material offers a number of opportunities for professors to craft useful and beneficial assignments for students.

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The Illinois International Accounting Symposium
held at the Faculty of Economics – University of Catania
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Other than an international dimension, there is no particular theme for the Symposium.

Authors are invited to submit research papers for presentation. Submitted papers will be anonymously reviewed. The Symposium Program Committee will select papers for presentation based on the comments of reviewers, the quality of the work and the potential for contributing to the literature. Registration fees are waived for authors, co-authors, and discussants appearing on the program. There is limited space for other participants who would like to attend. No registration fee will be charged for the first twenty registrants other than the presenters and the discussants. The travel cost and the cost of lodging for three nights (up to €1200 Euros in total based on receipts) will be provided for one author and one discussant for each accepted paper. Accepted papers will be published in *The International Journal of Accounting*, a publication of Elsevier, after satisfying the refereeing process.

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